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## EPIDEMIOLOGY OF ENCEPHALITIS: WESTERN EQUINE TYPE, MANITOBA, 1941

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IN 1941 Manitoba was unfortunate in having epidemics of poliomyelitis and encephalitis. These ran concurrently but the poliomyelitis started earlier and lasted longer. Epidemics caused by neurotrophic virus have been many in Manitoba. Although this Province is relatively young and small in population we have records of the following:

*Encephalitis lethargica* in the winter of 1919-1920 and again in 1923 (Vienna, or Economo type).

*Poliomyelitis*, a small epidemic in 1920 (20 deaths).

*Poliomyelitis* in 1928 (434 cases and 43 deaths) with a small repeat in 1929.

*Poliomyelitis* in 1936 (539 cases and 37 deaths) with a definite repeat in 1937 (261 cases and 12 deaths).

*Encephalitis* in 1938 (27 cases and 6 deaths) associated with similar epidemic in Saskatchewan (our neighbouring Province to the West).

*Infective neuronitis* in 1940. This was a small epidemic in one of our mental hospitals, with a few cases in the town close by. It affected chiefly nurses, maids, and attendants, was quite mild, and there were no deaths. Specimens of blood from two of the patients were tested against virus, of the equine type both Eastern and Western, St. Louis and Japanese B, by the neutralization method and found negative.

*Poliomyelitis* in 1941 (966 cases with 18 deaths).

*Encephalitis* in 1941 (509 cases with 78 deaths).

Before discussing the 1941 epidemic we wish to mention briefly the small 1938 outbreak. From 1933 on the horse population in both Manitoba and Saskatchewan suffered recurring attacks of equine encephalomyelitis. Each year it became more prevalent, culminating in widespread epidemics in 1937 and 1938, after which vaccination against this disease was carried out fairly thoroughly and the outbreaks have become smaller. In 1938 the first human cases were reported from the Russell area, in the Western part of Manitoba. Three other scattered areas had at least one case each. At the same time Saskatchewan had small out-

breaks in three areas. The epidemics in horses commenced in June, whereas those in human subjects were from July 20th, running on to October.

The original foci in horses in the earlier years appeared to be scattered, but by 1938 the disease was prevalent everywhere. Specimens of blood from five human patients in Manitoba in the 1938 outbreak were sent for neutralization test to the Rockefeller Institute for Medical Research. All were negative against both Eastern and Western equine virus; one showed questionable protection against St. Louis type virus; another, questionable protection against St. Louis type virus and definite protection against the Japanese B. type virus.

In 1939 Dr. Fulton, D.V.M., of Saskatchewan, was able to isolate the Western equine virus from the brain tissue of an infant who had died of encephalitis. This case was from one of the areas in Saskatchewan where an outbreak in human beings had occurred in 1938.

### INTRODUCTION OF THE DISEASE IN MANITOBA IN 1941

This paper does not attempt to deal with the general cause, methods of spread, control, etc., of encephalitis, but is simply a résumé of the findings in this Province. Because poliomyelitis ran concurrently, comparison of the two diseases will be made from time to time throughout the text.

Sporadic cases of poliomyelitis occur in Manitoba every year, but when more than usual were reported in the latter half of June, 1941, and a few cases every day in the first week in July we realized that we were in for an epi-

demic, and probably a large one, as it was starting a month earlier than our usual experience. Then in the latter half of July cases appeared which were not typical poliomyelitis, yet had many of the same symptoms and findings. It soon became apparent that we had also an epidemic of encephalitis on our hands, and it certainly was a unique experience!

When the epidemic of poliomyelitis appeared, Dr. F. W. Jackson, the Deputy Minister of Health and Public Welfare, called together an advisory committee composed of representatives from local public health authorities, hospitals, and the Medical College of the University of Manitoba. This Committee carried on also with the encephalitis epidemic. They met once a week until the outbreak had waned and gave great assistance in the "attempted control". Suitable publicity was given by radio and in the daily papers. Circular letters describing the two diseases were sent to every doctor in the Province, to aid him in diagnosis. At the first meeting of the advisory committee it was decided to try to hospitalize as many of the poliomyelitis cases as possible and this scheme was also applied to encephalitis. Over half the cases of both diseases were hospitalized. Dr. J. D. Adamson, Professor of Medicine, University of Manitoba, was asked to see all cases in hospitals in Winnipeg and St. Boniface as consultant, and the epidemiologist of the Provincial Department of Health and Public Welfare tried to visit the physicians in the rural areas, discuss cases with them, and assist in diagnosis when this was in doubt. This was a considerable task, as in six weeks 3,600 miles were travelled, about half the doctors interviewed, and countless cases seen. But by this means and the use of questionnaire forms we feel that reporting was fairly complete, diagnosis was reasonably accurate, and much information was obtained. Luckily, most of the Manitoba physicians were well acquainted with poliomyelitis through their experience in the epidemics of 1936 and 1937, and although encephalitis of this type was new to them they soon became proficient in its diagnosis.

Dr. J. D. Adamson, in his paper which also appears in this issue, discusses the diagnosis, so that this aspect of the disease will be omitted here. We might mention, to illustrate the increased difficulties during a twin epidemic, that in 32 cases originally reported as poliomyelitis the diagnosis was later changed to encephalitis

and ten cases originally reported as encephalitis were later changed to poliomyelitis! Influenza, typhoid fever, sun-stroke and heat-stroke all added to the confusion but were carefully weeded out.

TABLE I.  
ENCEPHALITIS 1941  
CASES AND DEATHS IN AREA OF THE EPIDEMIC

Province or State	Cases	Case rate per 100,000	Deaths	Case fatality rate
Manitoba . . . .	509	70.5	78	15.3
Saskatchewan	543	61.2	44	8.1
Minnesota . . . .	639	22.9	86	13.5
North Dakota	1,101	171.5	138	12.5
Total . . . .	2,792	55.3	346	12.4

The epidemic of encephalitis in Manitoba was only a part of a larger epidemic occurring in the contiguous States of Minnesota and North Dakota and the Province of Saskatchewan, as shown in Table I. North Dakota shows a very high attack rate and apparently has a large reservoir of infection. The case fatality rate in Manitoba is higher than in the other areas reported in Table I, but this may perhaps be explained by the fact that our Division of Vital Statistics carefully surveyed all records of deaths during the epidemic, and where encephalitis might possibly have been the cause of death the physician was consulted and in two cases the diagnosis was changed and the deaths attributed to encephalitis; also the first two cases which were reported on April 15th and 16th were not typical and though they are included among the deaths were probably not of the equine type.

#### DISTRIBUTION OF THE DISEASE IN MANITOBA

The true epidemic started July 16th with a case in Winnipeg, and from then on, until August 1st, sporadic cases appeared in widespread areas. On August 1st seven cases showed onset in five different districts and each succeeding day there was an increase of cases and involvement of new areas. One cannot say that the disease "spread", as we would with most communicable diseases: it simply seemed to appear in different parts of the Province with no apparent method of contact or transport. It would appear that the infection was widespread and a person might become infected anywhere! Of a total of 192 cities, towns, rural municipalities, and unorganized territories, 122 had cases. Some had only one case and others had many, but a pin map of the Province shows the

populated area to be well "peppered", with the Southern third the greatest. Winnipeg and its suburbs, with nearly half the total population had 166 cases and the balance of the Province 343 cases, making the epidemic predominantly rural.

Chart 1 shows the onset of cases of poliomyelitis and encephalitis by weeks. The encephalitis, although commencing one month later than the poliomyelitis, was much more vertical in its climb, reaching an almost identical peak only one week later. It was more abrupt in its fall and a four week base line covered the bulk of the epidemic, whereas the poliomyelitis required nine weeks. Sporadic cases of both diseases continued to appear until Christmas, the last case of poliomyelitis being December 22nd and of encephalitis December 25th.

*Encephalitis*, with a total of 509 cases, 69 per cent were males and 31 per cent females. Of 78 deaths 43 were males and 35 females, giving case fatality rates of 12 and 22 respectively. This very marked difference is interesting, but we fail to understand why the female rate is nearly double the male rate.

Poliomyelitis had its highest incidence in the 5-9 age-group, but the 10-14 group was almost equal; 70 per cent were under 15 years; 86½ per cent were under 20 years.

Encephalitis, on the other hand, had its highest incidence in the 20-69 age-group, but the case rates per 100,000 were highest in the 70-79 age-group, with the "under one" group a close second and the 60-69 group not far behind. Only 19 per cent were under twenty years of age, whereas 81 per cent were twenty and over.

We might be justified, according to this epidemic in Manitoba, in saying that encephalitis

TABLE II.  
ENCEPHALITIS AND POLIOMYELITIS—MANITOBA, 1941  
CASES AND DEATHS BY SEX IN AGE GROUPS

Age group	Encephalitis						Poliomyelitis					
	Cases			Deaths			Cases			Deaths		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Under 1 year.....	13	14	27	2	1	3	10	17	27	2	2	4
1 to 4 years.....	7	6	13	..	3	3	83	48	131	1	1	2
Five-year groups:												
0 to 4 years	20	20	40	2	4	6	93	65	158	3	3	6
5 to 9 "	10	2	12	1	..	1	156	96	252	2	1	3
10 to 14 "	14	6	20	2	..	2	147	112	259	1	..	1
15 to 19 "	18	8	26	1	2	3	108	59	167	4	..	4
Ten-year groups:												
20 to 29 years	72	23	95	7	..	7	56	51	107	3	..	3
30 to 39 "	55	14	69	3	1	4	7	9	16	..	1	1
40 to 49 "	40	12	52	3	1	4	2	1	3	..	..	..
50 to 59 "	45	25	70	5	10	15	3	1	4	..	..	..
60 to 69 "	47	30	77	10	11	21	..	..	..	..	..	..
70 to 79 "	27	16	43	7	5	12	..	..	..	..	..	..
80+ years	3	2	5	2	1	3	..	..	..	..	..	..
Total.....	351	158	509	43	35	78	572	394	966	13	5	18

The case and death distribution by sex in age-groups is quite interesting and is shown in Table II. Poliomyelitis cases and deaths are shown for comparison. Chart 2 shows in comparison the case rates per 100,000 by sex in age-groups. It gives a much truer comparison than by cases alone, as the number of cases of encephalitis in the older age-groups is shown in its proper perspective.

*Poliomyelitis*, with a total of 966 cases, 59.2 per cent were males and 40.8 per cent females, i.e., the usual 60-40 distribution. Of 18 deaths, 13 were males and 5 females, giving case fatality rates of 2.3 and 1.3 respectively.

is a disease of those over twenty years and much more frequent in males, while poliomyelitis is of those under twenty and, although mostly in males, not to the same extent as encephalitis. The exception to this rule is the "under one year" group, in which the incidence is equal in the two diseases and the number of females is greater. This may be due to the fact that there is no difference in the environment of the two sexes at this age.

Chart 3 shows the case rate per 100,000 for both diseases in the 0-4 age-group. Under one year they are equal but in the one to four age-

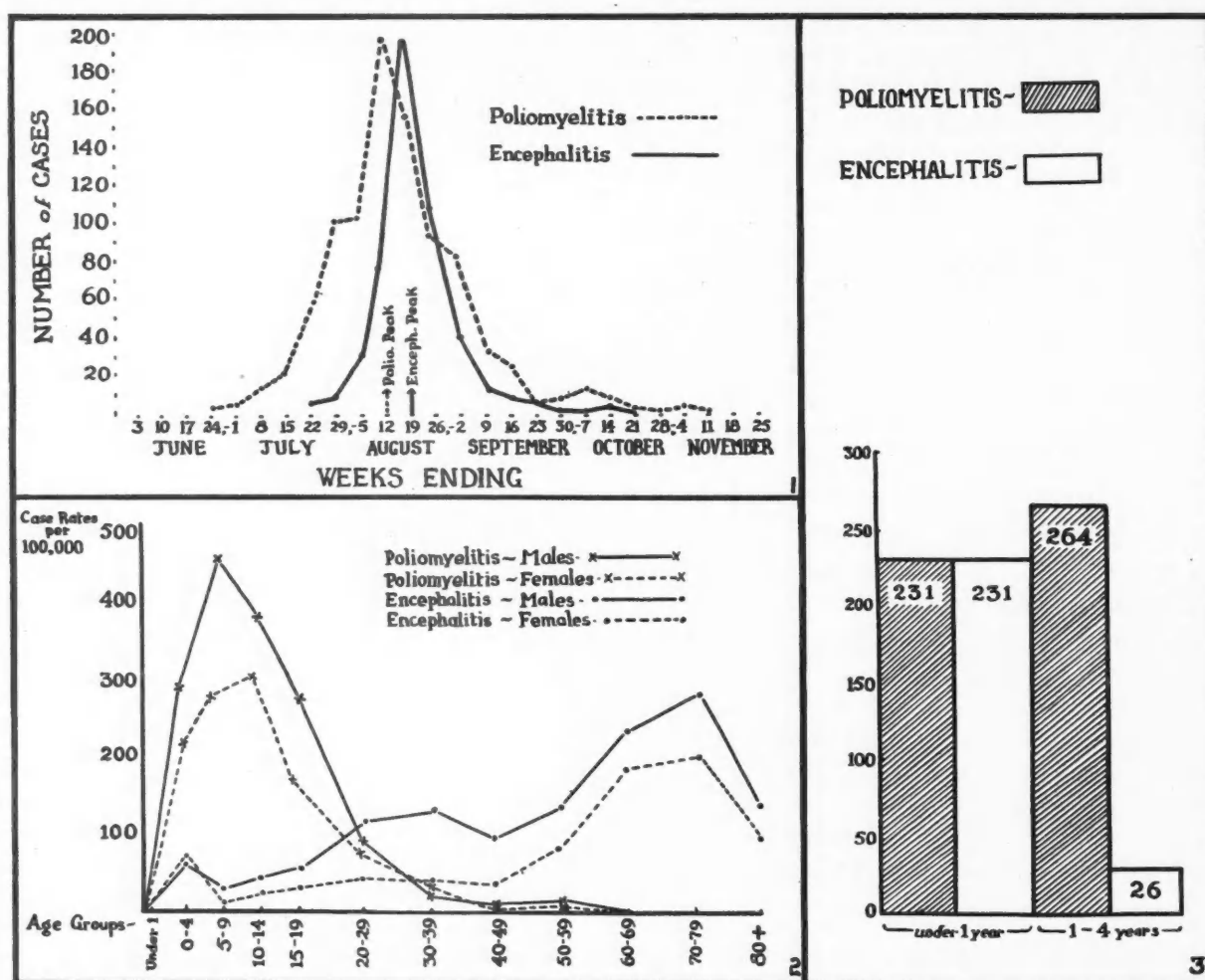


Chart 1.—Cases by week of onset. Chart 2.—Case rates by sex in age groups per 100,000. Chart 3.—Comparison of case rates per 100,000 population in the age groups 0-4 years.

group the poliomyelitis is ten times as high as the encephalitis. This strongly suggests unusual susceptibility during infancy.

#### INVESTIGATION

In addition to the clinical diagnosis further investigation was carried out on many blood specimens—this through the kind assistance of Drs. L. T. Webster and J. Casals, of the Rockefeller Institute for Medical Research, who did the complement fixation test, and Dr. Herald F. Cox of the United States Public Health Service Laboratories at Hamilton, Montana, who did neutralization tests.

The results are shown in Table III and simply record the findings as received, being primarily for the purpose of identifying the type of encephalitis present, and do not take into account the date after onset on which the blood specimens were drawn. In Dr. Adamson's paper will be found a more detailed discussion regarding the blood findings on this basis.

The high percentage of positive findings in clinically diagnosed cases was gratifying (69 out of 117). The number of negatives (48) may be partly explained by the taking of blood too early in the illness. Not sufficient second specimens were taken to re-check these. Six out of 17 specimens from "suspect cases" of encephalitis were positive, and these are to be reviewed and re-checked.

Of 78 specimens from clinical cases of poliomyelitis only 7 were positive for Western equine virus. From the 71 cases with the first specimen negative, eight second specimens and one-third specimen were also negative. These seven cases with positive blood findings will be reviewed and re-checked as to diagnosis. In this group of 78 cases, 35 were patients in the Children's Hospital, being treated for definite residual paralysis due to poliomyelitis, and were chosen as a blood control group, 34 were negative for Western equine virus and one was positive.

TABLE III.  
RESULTS OF NEUTRALIZATION AND COMPLEMENT FIXATION TESTS AGAINST WESTERN  
EQUINE TYPE ENCEPHALITIS VIRUS—MANITOBA, 1941

	Neutralization						Complement fixation						Totals of both							
	First specimen		Second specimen		Third specimen		First specimen		Second specimen		Third specimen		First specimen		Second specimen		Third specimen			
	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.		
Encephalitis.....	34	28	2	3	1	..	35	20	2	1	1	..	69	48	4	4	2	..	127	
Suspect encephalitis..	1	7	..	..	..	..	5	4	..	..	..	..	6	11	..	..	..	..	17	
Poliomyelitis.....	2	36	..	7	..	..	5	35	..	1	..	1	7	71	..	8	..	1	87	
Suspect poliomyelitis	1	4	..	..	..	..	..	1	..	..	..	..	1	5	..	..	..	..	6	
Miscellaneous.....	..	..	..	..	..	..	..	4	..	..	..	..	..	4	..	..	..	..	4	
Totals.....	38	75	2	10	1	..	45	64	2	2	1	1	83	139	4	12	2	1	241	
One poliomyelitis case—doubtful positive neutralization.....																				1
One miscellaneous—slightly positive complement fixation.....																				1
Specimens not heard from.....																				19
Grand total of specimens sent for examination.....																				262

Several mothers of infants under one year of age had blood tests and all were negative, excepting one, whose complement fixation was positive 1:4. She had given a history of a post-partum respiratory infection and her one week old infant showed C.F.\* pos. 1:16.

One six weeks' old male infant gave a negative C.F., then a positive C.F. and then Positive N.† for W.E.V.‡ and suspected St. Louis V.

A 21 year old male gave positive N. for W.E.V. and then a positive N. for both W.E.V. and St. Louis. A third specimen was negative N. for St. Louis virus.

A 71 year old female was negative N. for W.E.V. and positive N. for St. Louis.

So of the 243 specimens on which reports have been received one was positive and another suspected positive for St. Louis virus.

#### METHOD OF SPREAD

The cases of encephalomyelitis among horses during 1941 were on the wane when the human cases started. Only nine persons who developed the illness gave a history of having been in contact with sick horses. This must be a very, very small percentage of those who actually were in contact with sick horses, so that this method of spread may probably be ruled out, excepting for perhaps a few in which direct blood infection may have taken place through a skin abrasion.

\* C.F. is an abbreviation for complement fixation test and will be used for this purpose in the text.

† N. is an abbreviation for neutralization test and will be used for this purpose in the text.

‡ W.E.V. is an abbreviation for Western Equine Virus and will be used for this purpose in the text.

Reports of multiple cases in families were practically non-existent and the few there were had onset almost simultaneously. Contact in many cases was intimate—home nursing, etc. A daughter slept with her sick mother during the whole course of her illness and did not develop the disease. We have no report of any nurse who was nursing the disease during the epidemic becoming ill with encephalitis. We think contact may be entirely ruled out, barring accidental inoculation. In spite of this we realize that there were many cases of mild illness which may have represented sub-clinical infection.

We do not know how the virus enters the body, nor how it leaves, but we do know that it may be isolated from the brain, cerebrospinal fluid and blood during certain periods of the disease.

Toward the end of the epidemic we arranged for a physician to make a complete survey of 120 cases (50 urban and 70 rural). She visited them and their families, obtained histories, examined patients, surveyed their homes and surroundings. A mass of information in detail was obtained and studied. Much of it does not seem significant, but the outstanding facts were:

1. Almost 100 per cent were exposed to *mosquitoes*.—In Manitoba it was a year of heavy mosquito infestation and we doubt if anyone missed being "bitten".

2. *Exposure to sun and heat*.—Many cases were first diagnosed as sun and heat stroke.

3. *Overwork*.—On account of the war many people were short of help and worked over-time. Many older people who had retired started in to

help and worked harder than they had for years.

4. *Occupation*.—No significant information under this head was elicited, except that out-of-door workers did predominate.

From the results of many workers we know that many birds and animals, both wild and domestic, may harbour the virus. We also know that experimentally, mosquitoes have transmitted the infection. With contact ruled out on epidemiological grounds, it would seem that birds or animals, or both, may be the reservoir and that some insect vector may be the transmitting agent. More work must be done on the birds, animals, and biting insects common to the various areas where encephalitis has appeared. Weather may perhaps affect the vector and so the disease. It would appear that encephalitis will be a problem and impossible of control until this knowledge has been gained.

#### SUMMARY

1. We submit a brief report on encephalitis in Manitoba from 1938 to 1941, inclusive, dealing mainly with an outbreak of 509 cases during 1941 and referring to a concurrent epidemic of 966 cases of poliomyelitis.

2. During the four years serological tests have been reported positive in 83 cases for Western equine virus, one for St. Louis and one for Japanese B.

3. The 1941 cases were distributed widely throughout the province and occurred mostly during August. Roughly 70 per cent were among males. Eighty-one per cent of all cases were 20 years of age and older.

4. There were 78 deaths, giving a case fatality rate of 15.3 per cent.

5. There is no evidence that person to person spread was a factor in this epidemic. The disease may be insect-borne. The reservoirs of infection may be various and many.

### CLINICAL FINDINGS IN ENCEPHALITIS (WESTERN EQUINE)\*

BY J. D. ADAMSON AND SARA DUBO

#### Winnipeg

THE term "acute encephalitis" arouses in the minds of most of us vague recollections of the "lethargic" epidemics of twenty years ago and also the memory of occasional isolated cases of cerebral inflammation which have followed acute infectious fevers or vaccination, or have appeared for no apparent reason. Till recently these latter have been rare and regarded as clinical curiosities, and only in the past few years have epidemics of encephalitis become more frequent on this continent. It seems likely that they will be still more common in the future, and any community in Canada must anticipate possible outbreaks. Clinical and epidemiological studies are therefore of some importance.

The various sorts of encephalitis can still not be differentiated by clinical means. Differentiation should become possible since the antibodies of several types are now discoverable in the blood of persons who have been infected. Four varieties (Western equine, Eastern equine, St.

Louis and chorio-meningitis), may now be recognized by complement-fixation and neutralization tests. Unfortunately, the blood is not positive until the acute stage is past, so that one can classify individual cases only in retrospect. But with this method of identification, groups of each variety may be studied with the hope that the characteristics of each may be discovered.

The widespread epidemic of the Western equine type in Manitoba in the summer of 1941 offered an excellent opportunity for study. The Department of Health and Public Welfare made a thorough investigation possible by encouraging hospitalization and providing all possible assistance. We were able to examine 266 cases with a tentative diagnosis of encephalitis admitted to hospitals in Winnipeg and St. Boniface. After thorough examination, lumbar puncture and hospital observation in all and serological tests in 125, the diagnosis was confirmed in 212 cases. This number constituted 50 per cent of all the cases notified in the Province. Each case was subjected to a searching scrutiny, because we were continually confronted with the problem of differentiation from

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poliomyelitis which was epidemic at the same time. The material presented here was derived from an analysis of the findings in definite cases of encephalitis (Western equine).

### SYMPTOMS

As is the case with most virus diseases there was an enormous variation in severity; some fell into profound coma within twenty-four hours and remained so for a week, others had symptoms that were almost negligible. But there was a common pattern which was usually not hard to recognize. Before going into details we shall describe a moderately severe case.

The patient is a male adult who has been vigorous and active and employed at an outside job. In July or August he becomes ill. While working in the field he develops a headache which is predominantly frontal. At the same time, or soon after, deep aching pain is felt in the neck or spine and he becomes drowsy, but for a night or two may have insomnia, usually attributed to the headache. During the first few days he continues at his work in spite of severe headache, drowsiness, abnormal sweating and chilliness. Vomiting occurs during this period; anorexia and constipation are severe. His associates notice that he is dull, listless, confused and slightly disoriented, so that his behaviour may be described as "funny". In spite of this he admits nothing except headache and may be resentful of any effort to help him.

Within the first few days of the onset he stops work and spends most of his time in apparently normal sleep. He may lie for hours clasping his forehead in both hands and may be restless and complain of pain. On being aroused he shows all the evidences of disorientation in space and time, though he takes fluids and responds to questions intelligently, but very slowly. His only complaint is of headache and backache. He is quite oblivious of his mental torpor and though denying somnolence blandly dozes off while being examined. At night he may be restless or mildly delirious, but is amiable and easily controlled. This state continues for several days, after which rapid improvement takes place.

The following table lists the common symptoms and shows the percentage incidence of each in the cases reviewed.

*Headache* was almost a universal symptom—only 3.7 per cent having escaped. It was usually frontal (81.8 per cent) and confined to that region in 34.2 per cent. Headache con-

TABLE I.

Symptom	Percentage occurrence
<i>Headache</i> .....	96.3
Frontal .....	81.8
Frontal alone .....	34.2
Temporal alone .....	7.5
Occipital alone .....	4.8
<i>Sleep disturbance</i> .....	92.2
Somnolence alone .....	71.3
Insomnia alone .....	6.2
Both (insomnia followed by somnolence) .....	14.7
<i>Cerebral symptoms</i> .....	73.7
<i>Muscle pains</i> .....	62.5
Neck .....	42.0
Back .....	46.6
Limbs .....	20.0
<i>Chills and sweats</i> .....	75.5
<i>Vomiting</i> .....	46.8
<i>Visual disturbances</i> .....	14.7

fined to other regions was rare (temporal 7.5 per cent and occipital 4.8 per cent). The average duration was slightly over a week. It was commonly so severe for the first few days as to dominate the picture. Movement increased the pain, and lumbar puncture gave relief to some, though no definite association with spinal fluid pressure was discovered. In most cases headache was the one symptom that patients did not discount and it was for that reason alone that they sought medical care.

*Disturbance of sleeping habits* was, after headache, the most common symptom, 92 per cent having been affected. Abnormal drowsiness was found in 86 per cent. Included in this are some (14.7 per cent) in whom there was first insomnia and later somnolence; 6.2 per cent had insomnia alone. It was remarkable to observe how completely complacent most patients were about somnolence. It did not produce the slightest anxiety; commonly they passed it off with a smile or offered the excuse that they always slept when there was no particular work to do. The sleep as a rule appeared peaceful but some complained of terrifying dreams and some protested that they had been awake all night in spite of the nurses' conviction to the contrary.

*Cerebral symptoms.*—Various degrees of mental effects were noted in 73.7 per cent. These were much out of proportion to, and more persistent than, fever and other evidence of toxæmia. The commonest abnormality was general dullness, which sometimes was not detectable except by acquaintances or members of the family. In some cases this vague mental fogging could be appreciated only in retro-

spect, when the patient was recovering his normal alertness. As has been indicated, most were not disturbed about their condition; anxiety was entirely absent, and frequently they could not understand why they should be kept in hospital. This general torpor varied in degree up to complete stupor and even coma (10 per cent). Several patients lay in deep unconsciousness and were incontinent for three or four days, and finally recovered. Indeed, there is likely no brain condition in which unconsciousness persists for so long without being followed by death or gross disability. Confusion and disorientation were common. A few were hyperkinetic, especially at night, but wild delirium was rare. Amnesia covering the irrational period was the rule, and some had a complete memory blank for the whole febrile course. Convulsions at the onset were the rule in infants but observed in only one adult who had frequent right-sided Jacksonian attacks that recurred for two days and was followed by recovery.

*Muscle pains* of some sort occurred in 62.5 per cent, which was usually along the spine but sometimes in the limbs. On the average it persisted for only four days and was much less severe than the headache. It was described as a dull ache, and its site was often poorly defined though it seemed to be referred to deep muscles.

*Chills and sweats* occurred alone or in combination in 75.5 per cent of the cases. The chills rarely amounted to rigor but sweating was often profuse and prolonged. The odour was musty and, according to some observers, it had a distinctive and repulsive quality.

*Vomiting* occurred in 46.8 per cent of cases. It was early in the course of the disease and not frequent or persistent, usually lasting only one day and practically never more than three.

*Visual disturbances.*—Definite diplopia was found in 14.7 per cent of the whole group. About an equal number had indefinite disturbances which were recorded as "blurred vision". A few had mild photophobia.

#### PHYSICAL FINDINGS

*Facial appearance.*—There were four rather common signs to be noted about the face, i.e., flushing, sweating, masking and bloating. The general impression often created in the acute stage was that the patient was a coarse, plethoric and perhaps a debauched person. The nose was red, the conjunctivæ blood-shot, and there was a

puffiness about the eyes and general congestion of the countenance; this, together with dysarthria, tremor and complaints of headache and diplopia created a convincing picture of the "morning after the week before". These striking facial changes could often be appreciated only when the patient recovered; the transformation was so profound that time and again we failed to recognize patients whom we had observed intently only a day or two before.

As a rule physical findings were surprisingly scanty and variable from day to day. In many severe cases abnormal neurological findings were almost completely absent. They indicated, when present, widespread but mild upper motor neurone and striate involvement. Common findings and their percentage incidence are listed below.

TABLE II.

	Percentage
<i>Stiffness of spine</i> .....	67.7
Back .....	65.8
Neck .....	58.7
Both .....	40.5
<i>Abnormal reflexes</i> .....	68.6
Absent knee jerks and/or ankle jerks .	45.6
Absent abdominals .....	51.0
Upgoing toe .....	30.0
Tremor .....	58.6
<i>Dysarthria</i> .....	31.5
<i>Nystagmus</i> .....	22.7
<i>Rigidity</i> .....	18.0
<i>Sphincter paresis</i> .....	18.1
<i>Kernig's sign</i> .....	8.5
<i>Dysphagia</i> .....	2.0
<i>Paresis</i> .....	14.0

*Stiffness of the spine* was not so significant as the figures suggest. It was commonly not noticed by the patient and persisted only during the acute period, that is, for four or five days. It impressed one as not being meningeal in origin largely, because attempted flexion of the head seemed not particularly painful and did not induce the Brudzinski response.

*Abnormal reflexes.*—Nearly 70 per cent had some abnormality of one or more of the four common reflexes. Briskness and sluggishness of the tendon jerks have been discarded as being of no special value. Absence of one or more tendon reflexes in the lower limbs was found at some time in half of the cases. Up-going toes were found by Babinski's, Oppenheim's or Chaddock's method in 30 per cent. Absent abdominal reflexes were present in more than half of the cases and was the most consistent and valuable of all the neurological signs.

*Tremor* was present in 58.6 per cent and was of value in differentiating from poliomyelitis. It was most common in the tongue, next in the lips, and then in the hands. It was of the "intention" variety; the tongue was tremulous on first being protruded, the lips on attempting to speak, and the hands only on voluntary movements.

In addition, there was in a few severe cases definite *cog-wheel* rigidity in the limbs. In infants general spasticity of all limbs was the rule; this was of the lead-pipe variety. Two boys (aged ten and twelve) had rigidity and flexion of all the limbs for several weeks. One of these died in the sixth week and post-mortem showed equine encephalitis. The other made a miraculous recovery; after being rigid, almost completely paralyzed and unable to speak for five weeks, he suddenly began to recover, and in the course of a month became apparently normal, except for slight difficulty in swallowing and paresis of one hand. Blood examination was positive for Western equine antibodies on the twenty-eighth day.

*Dysarthria* was present in 31.5 per cent, and appeared to be due to stiffness and tremor of the lips and tongue. That it was entirely secondary to this is suggested by the fact that over 90 per cent of those with dysarthria also had obvious tremor. Those with general rigidity were quite incapable of articulation and only made themselves heard by whining in a monotone.

*Nystagmus* was found in 22.7 per cent and was a dependable differential point. If definite nystagmus existed, we were much inclined to a diagnosis of encephalitis rather than poliomyelitis. It was variable in its appearance and as a rule was found only during the first half of the illness. In some cases it was observed only on a single occasion.

*Kernig's sign* (8.5 per cent), was surprisingly rare; this fact was useful in differentiation from various sorts of meningitis. One might infer from this that meningeal involvement is not great.

*Dysphagia* was found in five patients. This was evidently due to paralysis of the muscles of deglutition and was always associated with dysarthria. It only occurred in those who were desperately ill; of the five, four died.

*Bladder and bowel* symptoms were common, but probably not more prominent than in any other central nervous inflammation of equal

severity (e.g., tuberculous meningitis). Incontinence of feces or urine or both was found in 18.1 per cent. It was present only in stuporous or comatose patients and was likely due to that alone. A few had urinary retention and required to be catheterized. Constipation was almost always present and was sometimes associated with distension and discomfort; it was a persistent complaint in some. Our impression was that all these symptoms were due to general toxic effects rather than to specific neurological lesions. The chief evidence for this is that they invariably recovered as toxicity diminished.

*Paralysis* during the acute stage was not severe nor frequent; only thirty cases (14 per cent) were found and were classified as follows:

TABLE III.

Face .....	10
Limbs .....	12
Ophthalmoplegia .....	2
Ptosis .....	2
General weakness .....	4

The limb paresis was all upper motor neurone in type and was never severe enough to interfere with ordinary activity.

#### TEMPERATURE AND PULSE

Fig. 1 is a composite chart made from all the cases. Temperature reaches an average peak of 102° on the second day and gradually falls, to disappear on the tenth. The average pulse is relatively slow and does not go above 100. There were wide variations from this average course, but neither hyperpyrexia nor a completely afebrile course was encountered. The temperature was not a dependable indication of recovery. Very often confusion and delirium persisted for some days after fever had disappeared.

#### CEREBROSPINAL FLUID

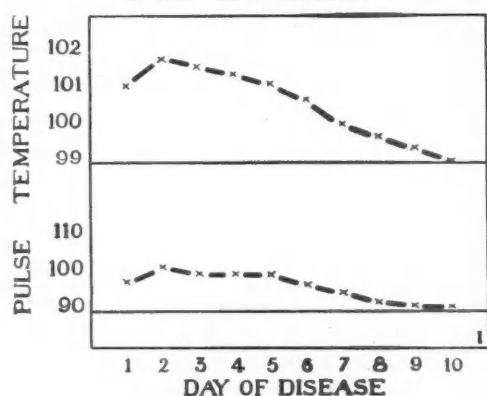
Lumbar puncture was done on every case and was occasionally repeated—249 punctures in all. Twenty-eight (14.0 per cent) were found to have a cell count under 10. Forty-one per cent gave counts between 10 and 99. Twenty-one (10.5 per cent) were over 400. The total cell counts on different days are shown in Fig. 2.

The highest counts are found on the first four days, averaging nearly 150 cells on each day. There is then a drop to 75 on the sixth day, followed by a secondary rise. Eleven cases,

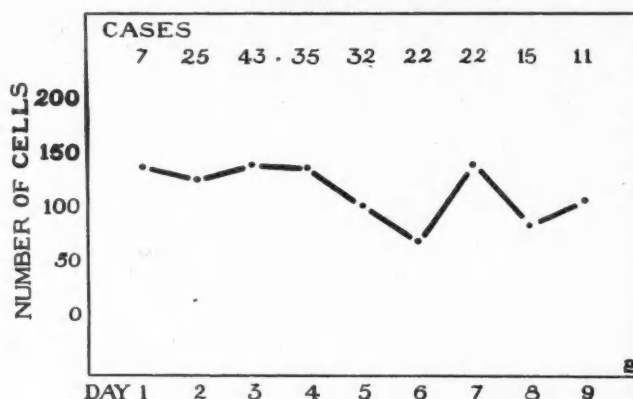
done on the ninth day, showed an average count of 113. It seems likely that the pleocytosis persists for several weeks in some cases. Two punctures done on the twenty-seventh and twenty-ninth days showed 30 and 12 lymphocytes, respectively. This finding may, on occasion, be of some value in diagnosis after the acute stage has past. Though 14 per cent of our cases gave a cell count of less than 10 on a single count, it is probable that very few cases run their whole course without some increase in cells.

fourth, fifth and sixth days. This also proved to be a differentiating point from poliomyelitis, in which monocytes were rarely found. One would judge from these figures that at the onset granulocytes and lymphocytes find their way into the spinal fluid in equal numbers. The granulocytes then disappear rapidly. Since the curve of their exit is quite similar to what happens in stored blood it seems likely that they are destroyed by simple lysis. The lymphocytes in contrast continue to increase in relative numbers right up to the end of the period

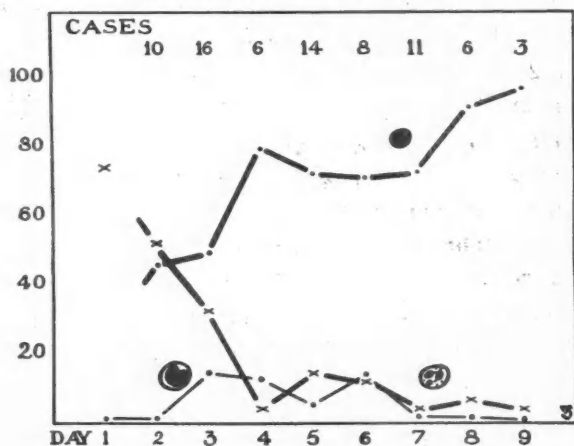
ENCEPHALITIS  
COMPOSITE TEMPERATURE  
AND  
PULSE CHART



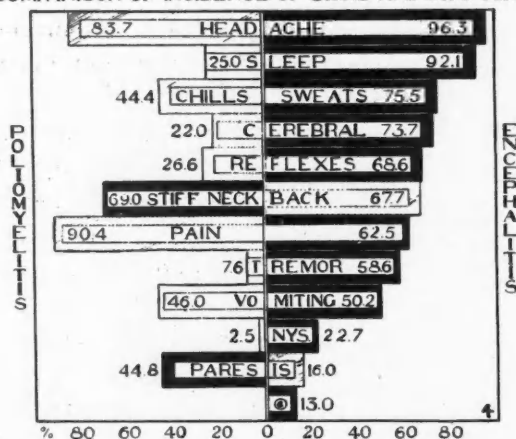
ENCEPHALITIS C.S.F. CELLS  
ON DAYS OF DISEASE



ENCEPHALITIS  
DIFFERENTIAL C.S.F. CELL COUNT  
ON DAYS OF DISEASE



COMPARISON OF INCIDENCE OF SIGNS AND SYMPTOMS



Differential cells counts were done on seventy-five cases, Fig. 3. The single case examined on the first day showed a 75 per cent preponderance of granulocytes. On the second day granulocytes and lymphocytes were evenly divided. The granulocytes then rapidly dropped to 4 per cent on the fourth day, but rose to 15 per cent on the fifth and sixth, after which they disappeared. Monocytes appeared in considerable numbers (about 15 per cent) on the third,

of observation (9 days). This increase must also be absolute since during this period the average total cell count falls but slightly.

#### BLOOD EXAMINATION

Leucocyte counts were done on only 25 cases during the first ten days. Sixteen of these were over 10,000 per cubic millimetre and none was over 16,000. We can say from this that mild leucocytosis seems to be the rule, but many

more cases should be tested to confirm this impression.

#### DIFFERENTIAL DIAGNOSIS

In an epidemic there is a tendency to over-diagnosis; cases with symptoms remotely resembling the disease in question are liable to be labelled without thorough scrutiny. In the case of an epidemic of encephalitis such over-diagnosis is not great, because diseases resembling encephalitis are rare in any community. The conditions, other than poliomyelitis, that were admitted to hospital, wrongly diagnosed, were: sub-arachnoid hæmorrhage (2), typhoid fever (3), uræmia (1), brain tumour (1), chorea (1), pneumonia (3), influenza (6), malingering (1), disseminated sclerosis (2), cerebellar abscess (1), meningitis (2), Menière's syndrome (2) and mumps encephalitis (1). The diagnosis in most of these became evident on further examination; the cerebellar abscess was recognized only on autopsy. On the other hand, several cases coming into the general hospitals with a diagnosis of cerebral vascular disease proved to be encephalitis. The spinal puncture in these latter cases usually made the diagnosis, but some were discovered only post mortem.

On the other hand, definite cases may have a negative serum reaction during the first three weeks or longer. The only sure method of diagnosis is to observe a change in serological reaction during the course of the illness. We have had only two such opportunities. One patient gave a negative complement-fixation test on the eighteenth day and a positive neutralization test on the ninety-third day; the other had a negative neutralization test on the eighth day, which was reported positive on the sixty-ninth. Both were typical clinically.

The complement-fixation tests were done in the laboratory of Dr. L. T. Webster, Rockefeller Institute, New York. They were tested for Eastern and Western equine, St. Louis encephalitis, and for chorio-meningitis. None was positive for any virus except Western equine. The neutralization tests were done in the Rocky Mountain Laboratories, (Dr. H. R. Cox), Hamilton, Montana, and were for Western equine virus only.

Our experience with these tests is summarized in the table below. The figures in brackets represent the cases that were negative twenty-one days or more after the onset, and in each instance are included in the figure which precedes them.

TABLE IV.  
RESULTS OF COMPLEMENT-FIXATION AND NEUTRALIZATION TESTS

Clinical diagnosis	No.	Complement-fixation		Neutralization		Total	
		Positive	Negative	Positive	Negative	Positive	Negative
Definite encephalitis	49	25	3 (2)	14	7 (2)	39	10 (4)
Probable encephalitis	20	6	1 (0)	4	9 (6)	10	10 (6)
Doubtful encephalitis	15	1	6 (1)	1	7 (6)	2	13 (7)
Definite poliomyelitis	30	1	27 (25)	0	2 (1)	1	29 (27)
Probable poliomyelitis	9	1	4 (4)	2	2 (2)	3	6 (5)
Doubtful poliomyelitis	2	0	0	0	2	0	2 (2)
	125	34	41	21	29	55	70

The most convincing single evidence of this disease is a positive complement-fixation or neutralization test. Even this, if found positive or negative on a single occasion, is not absolute proof. Since there has been encephalitis in horses in Manitoba during the past three years a certain unknown proportion of the population may have positive blood even though they have had no acute illness. Such persons may have erroneous serological diagnoses made when they suffer from any illness with nervous symptoms, but this would be at most a rare event and false positives are probably uncommon.

Blood samples of 125 patients were submitted for examination: (ten of these had two samples tested). Before sending the blood, we had already classified the patients according to our clinical judgment as indicated above. There were 49 in whom we felt that the diagnosis was unequivocal, and whose blood was sent largely to identify the type of encephalitis; of these, 39 were confirmed and 10 were not. Of the 10 negative cases, 6 had been ill for less than 21 days, *i.e.*, 14, 3, 18, 18, 17 and 13 days respectively. These were typical in all respects and we feel sure that they were

suffering from encephalitis of some sort. The other 4 had had their initial symptoms more than 21 days before the test. Each one had convincing evidence of encephalitis. No other cause for their illness was found and all recovered. Two were negative to complement-fixation and two to the neutralization test. From these negative results, we must assume that some cases do not develop antibodies in sufficient quantities, or that a virus other than those tested for was involved in the epidemic.

There were 20 cases considered "probable" encephalitis, whose blood was examined; 7 had a complement-fixation test, 6 were positive and one was negative, but had been ill for only nine days. Thirteen had neutralization tests; 4 were positive and 9 were negative, and 6 of these were more than 21 days past the onset.

Fifteen cases considered clinically "doubtful" were submitted. Of 7 who had complement-fixation test, one was positive and 6 negative, but only one of these latter had been ill for three weeks. Eight "doubtful" cases had neutralization tests; one was positive and 7 were negative, and 6 of these had been ill for more than 21 days.

It will be seen that the complement-fixation test agreed much more closely with our clinical findings than the neutralization test. If we consider only the clinically "definite" and "probable" cases, and ignore the negatives who had been ill less than three weeks, we find that complement-fixation was positive in 31 out of 33 cases, *i.e.*, 93.9 per cent. Applying the same analysis to the neutralization test, we get 18 positives in 26 cases, or 69.2 per cent. If we bring "doubtful" cases also into the reckoning, the positivity for the two tests is 91.4 and 57.5 per cent, respectively. This difference in the two tests may be largely accounted for by the fact that the neutralization test is slower in becoming positive.

#### DIFFERENTIATION FROM POLIOMYELITIS

The principal difficulty arose in distinguishing encephalitis from poliomyelitis. The points of contrast are reviewed below.

1. *Age and sex incidence* have been compared in the article on epidemiology by Donovan and Bowman.

2. *Comparison of signs and symptoms.*

Twelve common clinical manifestations are contrasted in Fig 4. It will be seen that the two diseases have the same signs and symp-

toms and are contrasted only in the frequency and intensity of these. In the figure the frequency of each feature is indicated by horizontal lengths (and the figures they bear), intensity is shown by shading.

Poliomyelitis is on the average and in most respects a faint imitation of encephalitis. For this reason very mild cases of encephalitis and very severe cases of poliomyelitis are often hard to diagnose. The five common findings in encephalitis (*i.e.*, headache, somnolence, sweating, cerebral changes, and abnormal reflexes) may all occur in poliomyelitis, but they are less common and very much less pronounced. Poliomyelitis overshadows encephalitis in two respects only, *i.e.*, stiffness of the neck and production of paralysis. There are no absolutely differential points though the presence of nystagmus or tremor, or the discovery of monocytes in the spinal fluid are very strong evidence against poliomyelitis and much in favour of encephalitis. Flaccid segmental paresis is almost always due to poliomyelitis.

3. *Temperature and constitutional symptoms.*

—The acute stage of poliomyelitis occupied about half a week, encephalitis usually produced acute symptoms for a week. In both diseases there are many cases milder and less prolonged, in fact it seems likely that a large proportion of cases were "abortive" and undiscovered.

4. *Spinal fluid.*—The total counts from day to day were not different. The differential in encephalitis was sometimes distinguished by the presence of a moderate number of monocytes (5 to 15 per cent). Polymorphonuclear leucocytes tend to persist in the spinal fluid of unparalyzed poliomyelitis cases; this is in contrast to the paralyzed cases and also to the usual case of encephalitis.

5. *Serological tests* are the most convincing evidence of encephalitis; only by these were some mild cases of encephalitis diagnosed.

#### TREATMENT

The great majority presented no difficulty so far as treatment was concerned. The only problem presented by the average case was one of keeping up nourishment, because of stupor and anorexia. Most patients could swallow quite adequate quantities when aroused and intravenous fluid was but rarely necessary. For the few hyperkinetic cases bromides and chloral per rectum were given with benefit

Enemas were very frequently required because of stubborn constipation, distension, and abdominal discomfort. A small number required catheterization on a few occasions.

No particular effect from the sulfonamides was detected. Many patients were given moderate doses as a prophylaxis against secondary pulmonary infection.

We were much impressed with the necessity for prolonged rest. After the febrile period the patients themselves could see no reason for remaining in bed and invariably over-estimated the extent of their recovery. This sanguine outlook is characteristic of the disease. Several who insisted on going about soon after the acute stage had a definite recurrence of severe cerebral symptoms. We have come to feel that every definite case should remain in bed for at least four weeks, and be kept on limited mental and physical activity for some months.

#### RESIDUAL EFFECTS

The great majority of patients make a complete spontaneous recovery. Since 16 per cent are over 60 it is sometimes difficult to distinguish between post-encephalitis symptoms and those due to cerebral vascular changes. We feel that senile changes are likely to be induced or increased by acute encephalitis. Among younger people complete recovery usually occurs but subjective symptoms may persist for some months. Dr. Elka Graf examined 120 patients from one to three months after the acute attack. The subjective symptoms with percentage incidence is shown in the following table.

TABLE V.  
SUBJECTIVE SYMPTOMS

	Percentage
Headache .....	28.0
General weakness .....	33.0
Localized weakness .....	3.3
Muscle pain .....	7.5
Insomnia .....	6.6
Nervousness .....	19.1
Amnesia .....	26.5
Blurred vision .....	8.3
Diplopia .....	1.6
Confusion .....	4.1

In the same group objective findings were few; 13 per cent showed some tremor of the hands, tongue or lips and 2.5 per cent showed nystagmus. Only one that we know of had definite paresis.

After personally following a small number of patients with subjective symptoms ever since the original attack we feel that nearly all will recover, except for arteriosclerotic symptoms referred to above. There have been a few cases who appear normal and protest that they are well who, according to their families, have slight character changes. This sometimes is shown by irritability, but in not a few the consort believes that the patient has become more amiable and "easier to live with". Such a mellowing effect on the disposition is unique as a pathological effect.

#### SUMMARY

Encephalitis (Western equine) infection produces a fairly constant clinical picture. Subjectively the dominant features are headache (96.3 per cent), disturbance of sleep (71.3 per cent) and spinal pain (62.3 per cent). The characteristic constitutional effects are not unlike those of fairly deep alcoholic intoxication. The patient is drowsy and indifferent, and, when aroused, is confused or quite disoriented, but protests that he is well except for headache. He is usually quite complacent and not inclined to be quarrelsome or violent. In delirium he is amiable and easily controlled. The thick speech, the staggering gait, and the appearance of the face complete the picture.

The usual neurological signs are curiously like those in disseminated sclerosis. Nystagmus, intention tremor, absent abdominals and an up-going toe are common, and the speech, though not "scanning", is inclined to be jerky. The great difference from case to case is not in the variation in the symptoms present but in the great difference in the intensity of all signs and symptoms. There are many very mild cases, and some that are extremely severe.

No matter how severe poliomyelitis may be it never presents this picture; the general effect is in complete contrast to what is usually found in encephalitis. The child appears more alert than normal, is querulous with vague discomfort. Headache and neck ache are commonly the only symptoms volunteered, and during the first few days rigidity of the neck and spine are the only physical signs. Very mild encephalitis may produce a picture almost identical with this, and unless there is tremor, nystagmus or monocytic spinal fluid, or unless flaccid paralysis supervenes differentiation cannot be made without a serological test.

## SHOCK\*

BY PAUL G. WEIL†

Montreal

## III.

CONDITIONS USUALLY ACCOMPANIED BY  
HÆMODILUTION (CONCLUDED)

**T**RAUMATIC SHOCK (WOUND SHOCK). — The classical picture of shock—shock in its most profound form—is frequently seen in patients admitted to hospital with traumatic amputations, sustained usually in industrial and railroad accidents. Since in such cases there has been hæmorrhage, often of a very severe nature, a marked hæmodilution rather than a hæmoconcentration has been the almost invariable finding in the cases reported herein as shown in Cases 14 and 15, Diagrams 1 and 2. A moderate hæmodilution rather than a hæmoconcentration has also been a constant finding in cases of traumatic shock not associated with the severance of large blood vessels that occurs in traumatic amputation. In all cases of the latter type, moreover, there has been evidence of bleeding either into the tissues as shown by areas of ecchymoses or hæmatomas or from superficial vessels as shown by blood on the skin of the face, head, etc. Cases 16 and 17, Diagrams 3 and 4 further illustrate the blood findings in cases of traumatic shock.

In patients in shock who have lost blood as a result of trauma (or operation or simple hæmorrhage) the degree of hæmodilution will depend on several factors, including the time elapsed between injury and blood sampling, the amount and rate of blood loss, the state of hydration of the patient, etc. Hæmodilution may occur very rapidly and restoration of blood volume as indicated by hæmodilution may be considerable within a few hours after hæmorrhage as shown in Cases 14, 15, 16 and 17, Diagrams 1, 2, 3 and 4. The indications for immediate treatment implied in the rapid physiological response to hæmorrhage will be considered later.

Evidence of hæmodilution does not constitute proof of restored blood volume. Even though determination of the blood reveals the presence

of a low hæmoglobin, the process of hæmodilution may still be proceeding at the time of blood sampling, *i.e.*, blood volume may not have been completely restored. Such a consideration not only stresses the importance of extracellular fluid stores (for in a dehydrated individual the mechanism of blood dilution may be impaired and blood volume incompletely restored) but it also emphasizes that the blood loss, with resultant reduced oxygen-carrying capacity as well as a reduced blood volume, may be greater than is indicated by hæmoglobin determination. Although the organism can adjust or adapt itself fairly satisfactorily to chronic conditions, in acute conditions of the same kind *e.g.*, hæmorrhage, the adaptive processes may be too long delayed or may be exhausted and the organism be unable to meet satisfactorily the new conditions suddenly brought about.

Finally it must be realized that physiological processes are integrated and interdependent and react upon one another; they cannot be viewed in isolation. An acute reduction in oxygen carrying capacity below a certain level is known to cause profound circulatory disturbances.<sup>6, 10, 12</sup> In the presence of an acute reduction in blood volume an accompanying acute reduction in oxygen carrying capacity as well may bring about a degree of anoxia and in turn other pathological changes that may be contributory to the damaging effects of an acute reduction in blood volume.

In none of the cases of traumatic shock studied at the Royal Victoria Hospital for the past three years has hæmoconcentration been found to be present either on admission or at any time subsequent to admission regardless of whether recovery or death ensued. There are cases of traumatic shock occurring under conditions of war which are characterized by hæmoconcentration.<sup>8</sup> The reduced blood volume of which such hæmoconcentration is the reflection may be the resultant of one of several associated factors, *e.g.*, dehydration, a local loss of plasma into traumatized areas, burns or any combination of these. There are several possible causes of dehydration under conditions of war: (1) limited supplies of water prior to

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injury, (2) excessive sweating during the engagement in which injury was sustained, (3) lack of water during the period between injury and arrival at first-aid station, (4) sweating and vomiting after injury, etc. Such factors are either not present, or if present are operative to only a limited degree and for a much shorter period in cases of trauma due to industrial accidents under ordinary civil conditions.

As already mentioned in Part II, in considering dehydration shock, a further reduction of blood volume by slight hæmorrhage in a dehydrated individual in whom there may be an impairment in the physiological mechanism of response to hæmorrhage, may have as serious an effect as a massive hæmorrhage in an otherwise normal person. Both the finding of hæmodilution in the cases of traumatic shock reported herein and the finding of hæmoconcentration in the cases of traumatic shock observed in the last World War<sup>8</sup> may be reconciled on the basis of the above considerations.

It is quite probable that some cases of traumatic shock are due to neurogenic factors. In such cases the mechanism involved in the development of shock would be a reduction of effective blood volume similar to that which occurs in syncope and primary surgical shock<sup>2, 5, 9</sup> as discussed in Part II. Neither hæmodilution nor hæmoconcentration are concomitants of this form of shock, except as it may be complicated by hæmorrhage, dehydration, etc. For all practical purposes, however, since primary shock is not so serious or so frequent as shock due to a reduction in actual blood volume all cases of shock following trauma, it should be assumed, are due to an actual reduction in blood volume.

The rôle of histamine in traumatic shock is not clearly understood. Although the histamine content of the blood in cases of traumatic shock (and surgical shock following hæmorrhage and hæmorrhagic shock) is decreased<sup>11</sup> there is no evidence of any causal relationship between shock and the histamine level of the blood. Since, however, in some cases it has been found that changes in blood histamine go parallel with changes in blood volume (as indirectly determined by hæmoglobin estimations), *i.e.*, histamine is decreased during shock when blood volume is reduced and conversely histamine increases during recovery when blood volume is restored through hæmodilution, there

is some indication that histamine may be related to the physiological processes associated with blood volume changes that occur in shock and in the subsequent period of recovery.<sup>14</sup> Studies on histamine in shock however, have not yet reached the stage of practical significance.

**HÆMORRHAGIC SHOCK (POST-HÆMORRHAGIC SHOCK, SHOCK WITH HÆMORRHAGE).**—The clinical picture and blood findings of shock following uncomplicated hæmorrhage such as occurs postpartum, or with a ruptured ectopic pregnancy, or from gastro-intestinal ulceration, etc., as shown by Cases 18, 19, 20, and 21, Diagrams 5 and 6 differ in no way from those following many cases of traumatic shock with hæmorrhage and secondary surgical shock.

The effects of the sudden removal of even small amounts of blood (200 to 400 c.c.) are sometimes seen in blood donor clinics. Occasionally donors after the removal of such small amounts go into a collapse that clinically is indistinguishable from shock. The condition is characterized by a low blood pressure, pallor, sweating and a feeling of faintness; nausea and vomiting are sometimes present. Infrequently, the condition is preceded by momentary loss of consciousness, convulsions, cessation of respirations and cyanosis. The symptoms of shock usually disappear from within 15 to 60 minutes without any treatment other than rest in the recumbent position and warmth. There are other cases in which this syndrome does not appear until towards the end of the donation of approximately 500 c.c. of blood or even some minutes after the termination of the donation. This is a form of shock and although there undoubtedly are cases in which nervous factors are operative to bring about this syndrome, it is hardly likely that the collapse that occurs at the end of a donation is due entirely to nervous factors. This condition, furthermore, occurs in individuals who show no signs of apprehension and who even appear phlegmatic. It is reasonable to suppose that, since the same sort of clinical condition occurs both after venesection and after hæmorrhage such as in ruptured ectopic pregnancy in which the hæmorrhage is concealed from the patient, thus excluding psychic stimuli as a cause of shock, shock following venesection like shock following other forms of hæmorrhage is due to a sudden reduction in actual blood volume.

Shock in such conditions of simple (uncomplicated) hæmorrhage as those just mentioned is considered to be due to the reduction in blood volume resulting from blood loss. Although neurogenic factors may be contributory in some or even entirely responsible in other cases, it would seem highly improbable that toxic substances were operative at least as initiating factors in the production of shock following uncomplicated hæmorrhage. The observations that the clinical picture and blood findings in cases of hæmorrhagic shock<sup>4, 13</sup> are identical with those in many cases of traumatic shock with hæmorrhage and secondary surgical shock lend further support to the view that these forms of shock are due mainly if not entirely to a reduction in actual blood volume as a result of hæmorrhage. Although neurogenic and toxic factors can not be excluded as possible contributory or even initiating causes of these forms of shock, the evidence for them is not very convincing.

**TREATMENT WITH BLOOD AND BLOOD SUBSTITUTES.**—The rapid physiological response to hæmorrhage by hæmodilution is an indication for immediate treatment with blood substitutes, such as plasma or serum, for the restoration of blood volume. Such considerations, however, since the physiological response to blood loss is limited to the mobilization of fluid in the absence of any reserve of erythrocytes, must not lead to an underestimation of the value of whole blood in the treatment of shock due to severe hæmorrhage. In traumatic shock with hæmorrhage, hæmorrhagic shock and secondary surgical shock, especially where there has been a marked lowering of the hæmoglobin indicating a considerable reduction in oxygen carrying capacity of the blood, whole blood if available is the best transfusion solution<sup>1, 7</sup> as shown in Cases 14 and 21, Diagram 1. Plasma or serum, although they replace blood volume as shown in Case 15, Diagram 2, quite obviously do not replace oxygen carrying hæmoglobin of the erythrocytes. This is not to say that plasma or serum are not good substitutes; it is merely to point out that since they are not whole blood they can not be expected to fulfill all the functions of whole blood. It is probable however, that in many cases of traumatic shock and other forms of shock due to blood loss, in which the hæmorrhage has been severe but not massive the factor of reduced blood volume rather than that of reduced oxygen-carrying

capacity is the predominant one requiring correction, and it is in these cases that plasma or serum is an effective blood substitute<sup>3, 5</sup> as shown in Case 17, Diagram 4.

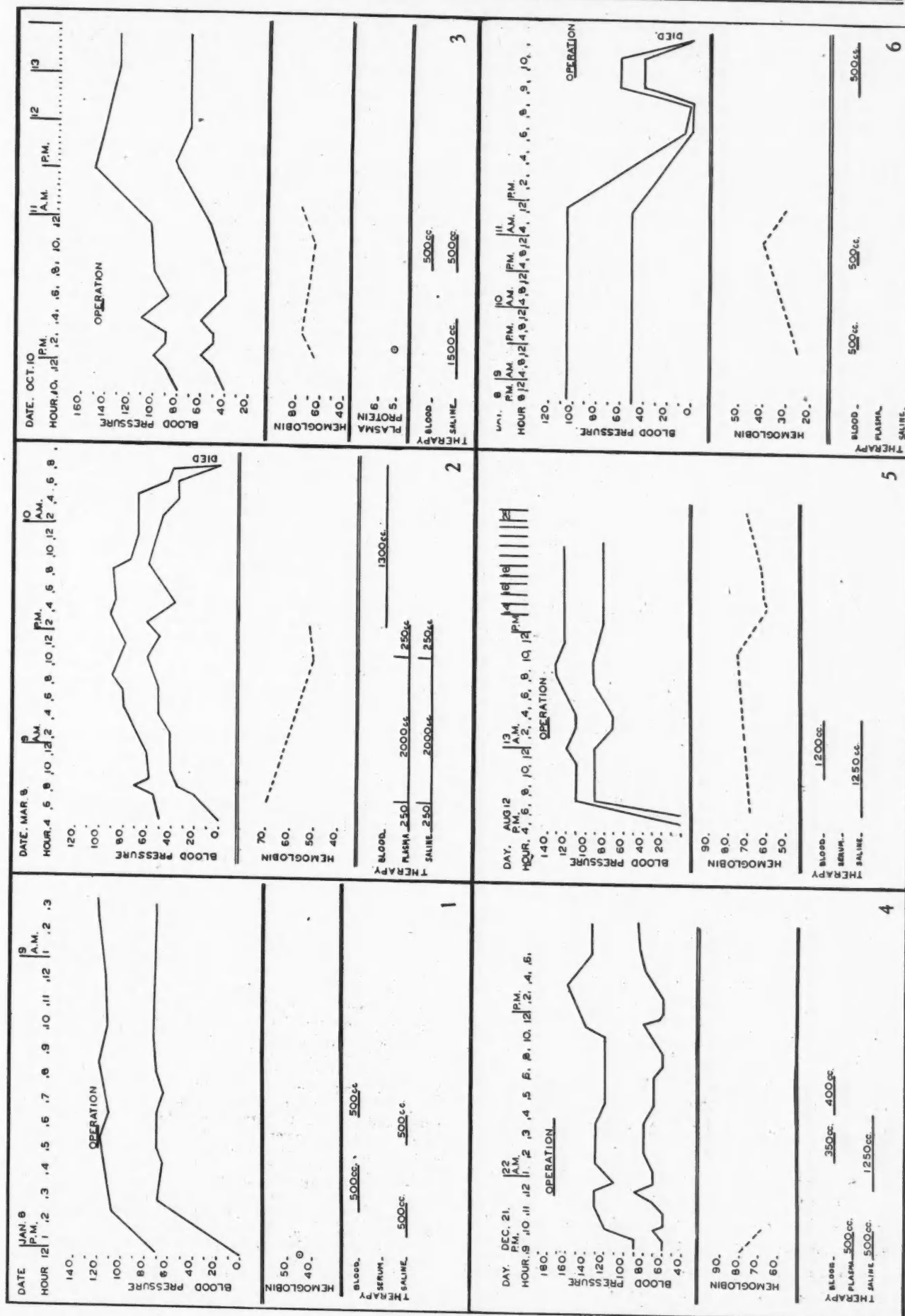
The advantage of plasma or serum, aside from that of availability, is that it may be given immediately. This is an important consideration, for in all cases of shock the elapsed time before beginning treatment is of the utmost prognostic importance. Therefore immediate treatment with plasma or serum (or saline if plasma or serum are not available) should be begun while the patient's blood is being matched preparatory to a blood transfusion, as shown in Cases 14, 17 and 19, Diagrams 1, 4 and 5. Under certain circumstances of severe hæmorrhage where the rapidity with which a blood transfusion can be performed is of crucial importance, Group O blood should be given immediately. The amount of blood<sup>5</sup> and of blood substitutes to be given will vary with the case depending upon how much blood has been lost and on the response of the patient to transfusion. As in cases of severe burns where much more plasma or serum is needed than was heretofore generally considered necessary, in many cases of hæmorrhagic shock and traumatic shock with hæmorrhage, more blood is needed<sup>5</sup> than was heretofore generally considered either necessary or safe as shown in Case 21.

#### CASE 14

Female, aged 19, Diagram 1 (87764). The patient was admitted within two hours of a railroad accident in which she sustained traumatic amputations of both legs just above the knee. On admission the patient was in severe shock; extreme pallor, stuporous, cold, clammy skin, pulse 100, respirations 36, blood pressure 70/0. The blood findings were red blood cells 3,000,000, white blood cells 25,000, hæmoglobin 45 per cent (the blood was obtained with great difficulty). She was sent to the operating room fifteen minutes after admission for débridement of the stumps. Because of the severity of the shock, however, the operation was cancelled.

Shock was immediately combated by warmth, morphia (although she did not complain of pain), elevation of the foot of the bed and an intravenous infusion of 500 c.c. of 10 per cent glucose saline. One hour after admission the blood pressure had increased to 100/60. Two and a half hours after admission a blood transfusion of 500 c.c. was begun. She was also given tetanus and gas gangrene antitoxin. Four hours after admission operation under ether anaesthesia was performed, consisting of débridement and ligature of the femoral arteries. During the operation 500 c.c. of 10 per cent glucose saline was given intravenously. She returned from the operation in good condition. Another transfusion of 500 c.c. of blood was given after her return to the ward.

Her general condition continued to improve, although gas gangrene developed in both stumps. The gas gangrene was successfully treated with anti-toxin and local drainage. She was discharged improved eleven weeks after admission.



This case of traumatic shock due to hæmorrhage illustrates (1) the presence of marked hæmodilution in traumatic shock following hæmorrhage; (2) the rapidity with which marked hæmodilution may occur; (3) the beneficial effects of whole blood given (a) soon after hæmorrhage and (b) in adequate amounts; and (4) the value of saline (or glucose-saline) as an emergency measure.

#### CASE 15

Male, aged 59, Diagram 2 (116735). The patient was admitted to hospital immediately following a railroad accident in which both legs had been amputated midway between the ankle and knee joints. He was unconscious and in profound shock, with pulse and blood pressure unobtainable, cold clammy skin, marked pallor, temperature 101°, respirations 35. Immediate treatment consisting of morphia, heat, elevation of the foot of the bed, and an infusion of plasma and saline was begun. Because of the seriousness of the patient's condition no attempt at local treatment was made other than wrapping the stumps in sterile towels.

Soon after treatment was begun his blood pressure could be obtained and continued to rise. He regained consciousness and his condition generally improved. Although no hæmoglobin determination was done on admission, the hæmoglobin was 70 per cent after approximately 400 c.c. of an infusion of plasma diluted with an equal amount of physiological saline solution had been given. During the twenty-four hours following admission he had a continuous infusion of plasma and saline amounting to 5,000 c.c. Throughout this 24 hour period, although he had regained consciousness, and his colour and blood pressure had considerably improved, he was very restless and his pulse had increased from 108 shortly after admission to 140. Because of the marked hæmodilution as shown by a hæmoglobin of 50 per cent twenty-four hours after admission, a transfusion of whole blood was begun. Despite transfusion of 1,300 c.c. of blood he became delirious, his blood pressure began to decline, his respirations increased, his pulse became more rapid and he died 42 hours after admission.

At autopsy there was found moderate arteriosclerosis of the aorta, coronary and cerebral arteries; the internal organs were all comparatively bloodless; the spleen was especially small and pale; the lungs were dry and only moderately hyperæmic.

This case illustrates the necessity of giving whole blood in cases of shock due to severe hæmorrhage, for although improvement followed treatment with plasma it was only temporary. It is possible that had he been given whole blood earlier during the first few hours following the improvement brought about by plasma, he might have recovered. The improved blood pressure at the time the blood transfusion was begun indicated a restored blood volume following the plasma infusion, but a hæmoglobin of 55 per cent indicated a marked reduction in the oxygen carrying capacity of the blood. It is conceivable that irreparable damage occurred during the 24 hour period following injury due to a reduction in oxygen-carrying capacity of the blood which was not only sudden but marked and persistent for some 24 hours. Compare

with Case 14, Diagram 1, in which a patient with a similar injury and a very marked blood loss, as indicated by hæmodilution, recovered after having received treatment with whole blood soon after admission to hospital.

#### CASE 16

Male, aged 71, Diagram 3 (114889). The patient was admitted following an accident in which he had been struck by a motor car 1½ hours previous to the time of admission. Examination on admission revealed a man who appeared slightly dazed and in moderate shock. He was pale, his skin was cold to the touch and his blood pressure was 80/40. He was bleeding from a laceration in the right popliteal region. His hæmoglobin was 65 per cent. An intravenous saline infusion was started and his condition improved. He was then given combined tetanus and gas-gangrene anti-toxin.

Further examination carried out while he was improving from shock revealed abrasions over the right shin, left ankle and knee, left and right elbows and a swelling and bruise over the right frontal area. In a few hours it was noted that there was a marked swelling of the right thigh presumably from subcutaneous hæmorrhage.

At operation under cyclopropane anæsthesia, a large contusive laceration of the skin and deep underlying structures of the right popliteal fossa was found. A large amount of blood clot was removed from beneath the fascia lata extending upwards from the wound. A tight bandage was applied to the upper leg, knee and lower thigh, after débridement and suturing of the laceration were done.

Because of the evidence of blood loss (low hæmoglobin and extravasated blood in the region of the injury) he was given a blood transfusion. His condition continued to improve. Eight days after injury a hæmatoma over the area of injury was evacuated under local novocaine anæsthesia; about 400 c.c. of old blood were removed. The wound which became infected, later healed and he was discharged improved 6 weeks after injury.

This is considered to be a case of traumatic shock due to hæmorrhage. The relatively moderate degree of shock as compared with that of Cases 14 and 15 may be explained by the lesser degree of hæmorrhage in this case as compared with that of Cases 14 and 15. Compare also with Case 17.

#### CASE 17

Male, aged 26, Diagram 4 (41-9115). This patient, a member of the R.C.A.F., was injured in an airplane crash. He was admitted to hospital four hours after the crack-up in a state of moderate shock with pallor, blood pressure 88/60, pulse 138, temperature 99, respirations 28, hæmoglobin 80 per cent. He was in a semi-stuporous condition but able to answer questions put to him in a loud voice. The injuries were a fractured nose, multiple lacerations of the face, loss of teeth, fracture of the 7th and 8th ribs with bruising of the chest wall, laceration and fracture of a finger, fracture of the right femur at the junction of the lower and middle third, compound comminuted fracture of the left femur at the junction of the lower and middle third with crushed and contused muscles in the region of the fracture.

He was immediately given 1,000 c.c. of a solution of plasma mixed with an equal volume of saline. At the end of the infusion which lasted an hour, he was out of shock with blood pressure of 120/70. Four hours later he was operated upon under pontocaine anæsthesia.

Operation consisted of boneplating both femurs after débridement of large areas of crushed muscles in the region of the fracture on the left side. The compound

wound (left side) was dusted with 60 grains of sulfathiazole powder and a vaseline pack inserted. A plaster spica was then applied. Throughout the operation which lasted 3½ hours he was given a continuous transfusion of 750 c.c. of blood and 1,250 c.c. of saline. After a slight drop in blood pressure to 90/60 shortly after the beginning of the operation, the blood pressure rose to 130/70 where it was maintained throughout operation. There was no further drop in blood pressure, his condition continued to improve and in two weeks' time when sutures were removed it was found that the wound in the left thigh had a small amount of suppuration coming from its depths, but otherwise both wounds were healthy.

This, like Case 16, is considered to be a case of traumatic shock due to hæmorrhage. The relatively moderate degree of shock as compared with that of Cases 14 and 15 is explained by the lesser degree of hæmorrhage as compared with that of Cases 14 and 15. In this case, unlike Case 16, it is possible to state approximately what was the extent of hæmodilution at the time of admission for it is likely that as an active member of the R.C.A.F. he would have had a hæmoglobin of approximately 100 per cent at time of injury. That it is the hæmorrhage associated with trauma rather than trauma *per se* (neurogenic or toxic factors originating at time of trauma or from traumatized tissues) which is the cause of shock in such cases, is shown by the findings in this case of moderate shock following (1) moderate blood loss and (2) severe and extensive trauma. This case also shows the immediate beneficial effects of plasma transfusion.

#### CASE 18

Female, aged 36 (36021). The patient was admitted at 7.45 a.m. to the medical service as an emergency. She had been well up to the previous evening when she developed diarrhoea, pains in the abdomen and shoulders, and progressive weakness with a feeling of faintness. Her last menstrual period occurred 7 weeks previous to the time of admission; the periods had always been regular. On admission she was in profound shock, extremely pale, showing some evidence of air hunger and appearing acutely ill. There was evidence of marked blood loss; the mucous membranes were almost white in appearance. The pulse was imperceptible, blood pressure 50/10, hæmoglobin 47 per cent. Examination of the abdomen revealed an area of dullness to percussion throughout the lower part extending from the symphysis pubis to the umbilicus and extending laterally into the flanks.

A diagnosis of ruptured ectopic pregnancy was made and the patient was transferred to the gynaecological service for immediate operation. She was given an intravenous of 200 c.c. of 10 per cent glucose saline followed by a blood transfusion, but by the time the blood transfusion had been started the blood pressure had become unobtainable. Respirations Cheyne-Stokes in character. Artificial respiration, caffeine sodium benzoate and adrenalin were all tried in an attempt to revive the patient. She died at 12.45, five hours after admission.

Autopsy revealed ruptured ectopic pregnancy, intra-abdominal hæmorrhage (2,500 c.c.), bilateral hydrothorax and pulmonary œdema.

This case is included because it is considered to have been a preventable death. Death could in all probability have been prevented had the blood bank been established at the time the patient was admitted, for although a professional donor was sent for soon after the patient was admitted to the hospital, by the time the donor had arrived and donated his blood it was too late for the transfusion to be effective. Had there been a blood bank in operation she could have been given any amount of blood immediately on admission.

#### CASE 19

Female, aged 31, Diagram 5 (41-4615). The patient was admitted with the complaints of sharp, stabbing pain in the epigastrium present for the preceding four hours. She got up the morning of the day of admission to hospital feeling slightly nauseated; about noon she vomited and shortly afterwards fainted. When she recovered from the faint she vomited again and from then until time of admission she had pain in the epigastrium. On admission physical examination revealed a well developed woman looking acutely ill, moaning and moving restlessly about in bed. She was in severe shock, deeply cyanotic, sweating profusely with a cold and clammy skin, blood pressure unobtainable, temperature 99, pulse 105, respirations 25.

Treatment consisting of warmth, caffeine sodium benzoate intramuscularly and intravenous saline was immediately begun. No morphia was given because the diagnosis was not clear. A diagnosis of ruptured ectopic pregnancy was later made on the basis of a hæmoglobin of 67 per cent, normal findings on x-ray examination of the abdomen (no free gas present, no evidence of intestinal obstruction) and the findings on pelvic examination of tenderness and fullness with a suggestion of crepitation in the right vault.

A transfusion of 1,200 c.c. blood was begun and the patient was prepared for operation. At operation which was performed under cyclopropane anaesthesia, a large quantity of blood gushed forth on incising the peritoneum. The diagnosis of ruptured ectopic pregnancy was confirmed. A salpingectomy was performed. During the operation continuous blood transfusion was given. The patient made a normal recovery and was discharged cured on the thirteenth day after admission.

This case of shock due to simple hæmorrhage, i.e., hæmorrhage unassociated with wound trauma or surgical operation, illustrates the fact that the clinical picture (extreme shock) and blood findings (hæmodilution) after simple hæmorrhage are no different from those in many cases of traumatic shock with hæmorrhage and secondary surgical shock. It also illustrates the immediate response to an infusion of saline and the continuation of improvement after a transfusion of an adequate amount of blood in cases of severe hæmorrhage.

#### CASE 20

Male, aged 62, Diagram 6 (111,453). The patient was admitted with the complaints of dyspepsia and weakness for the previous three weeks. A history of tarry stools and several spells of faintness during the week preceding admission was obtained. Examination revealed marked pallor, blood pressure of 105/50, pulse 120, respirations

20, temperature 100, hæmoglobin 24 per cent. Because of his poor general condition no active investigation of the gastro-intestinal tract was undertaken to determine whether the lesion responsible for the symptoms was a bleeding gastric carcinoma or a bleeding peptic ulcer.

Two transfusions of 500 c.c. each were given during the first 48 hours after admission to hospital. There was a marked improvement in his general condition following the second transfusion; the hæmoglobin rose from 25 to 45 per cent. Twelve hours after the second transfusion he had a profuse hæmatemesis followed by restlessness and the development of shock. Within a few hours the hæmoglobin had fallen to 32 per cent. He developed a sharp pain in the abdomen, vomiting of blood and examination revealed tenderness and rigidity of the abdominal wall with obliteration of liver dullness on percussion. X-ray showed a large amount of free gas in the peritoneum. A diagnosis of perforated peptic ulcer was made and preparation for immediate operation begun because it was thought that the lesion was a large bleeding vessel at the base of a perforated ulcer necessitating surgical intervention.

In the meantime, however, shock had become more extreme (blood pressure unobtainable). Operation was therefore delayed until a transfusion was begun. After the blood pressure had risen to 60/40 during the transfusion, operation under gas and ether anaesthesia was undertaken. A large perforation was found in the first part of the duodenum. There was no evidence of bleeding. The patient died during operation as drains were being inserted.

Autopsy which was limited to the abdomen revealed ulcerative purulent and proliferative duodenitis with penetration into the pancreas and perforation, rupture of gastro-duodenal artery with massive hæmorrhage into the gastro-intestinal tract, peri-insular cirrhosis of the liver and cholelithiasis.

This case of shock due to hæmorrhage illustrates the dilemma which frequently confronts the surgeon, of whether to operate immediately to find and ligate a bleeding vessel or to wait until the patient is partly recovered from shock. It is probable that if the patient had been given large amounts of blood (1,000 to 2,000 c.c.) as soon as symptoms of active bleeding appeared (in hospital) he would have survived the operation. The immediate availability of large supplies of blood through the establishment of blood banks will help to solve the dilemma, for then both local treatment of the lesion by immediate operation and general treatment of shock by large transfusion may be given simultaneously. It is probable that one reason for the persistence of the view that 500 c.c. constitutes a transfusion, regardless of the amount of blood actually needed, which may be 1,000 to 2,000 c.c. is the physical difficulty not of giving more than 500 c.c. but in getting more than one donor for any one patient at any one time through a transfusion service other than that of a blood bank. Compare with Case 21.

#### CASE 21

Male, aged 30 (42-2988). The patient was admitted with the complaints of (1) polyuria referable to diabetes which he was known to have had for 12 years and (2) weakness, tarry stools and vomiting of blood for four days prior to admission and loss of consciousness on

several occasions two days before admission. On physical examination there was a marked pallor; the skin was dry and he appeared dehydrated; he was very lethargic. Temperature 99.6, pulse 115, blood pressure 150/50, respirations 25, hæmoglobin 27 per cent, blood sugar 264 mg. per cent, CO<sub>2</sub> capacity 62.2 vol. per cent, non-protein nitrogen 129 mg. per cent, occult blood in vomitus and stools.

A diagnosis of diabetes and gastro-intestinal hæmorrhage was made. He was given insulin and put on routine diabetic orders. About 18 hours after admission he went into shock. It was thought that his condition was due to further active bleeding rather than to the diabetes and an immediate transfusion of plasma was begun while his blood was being typed. Within the next 20 hours he was given 2,000 c.c. of blood which caused a marked improvement in his condition and increased the hæmoglobin to 60 per cent.

One month after admission patient's hæmoglobin had increased to 88 per cent following repeated transfusion. During this time his diabetes was brought under control and no further bleeding occurred. The bleeding was thought to have originated in a duodenal ulcer for x-ray examination suggested the presence of a duodenal ulcer.

This case illustrates the large amounts of blood that are required for the treatment of shock following severe hæmorrhage. Treatment consisting of such large amounts of blood (2,000 c.c.) in such a short space of time (20 hours) would be extremely difficult if not impossible without the services of a blood bank. Compare with Case 20.

#### GENERAL CONCLUSIONS

Shock is due to an acute reduction in blood volume. The principal cause of shock is a reduction in actual blood volume as a result of a loss of fluid (blood, plasma or extracellular fluid) from the vascular system. Burns, a condition in which the reduced blood volume is due to loss of plasma, and dehydration, a condition in which the reduced blood volume is due to loss of extracellular fluid, are characterized by hæmoconcentration; secondary surgical shock, traumatic shock and hæmorrhagic shock, conditions in which the reduced blood volume is due to loss of blood, are characterized by hæmodilution. A reduction in effective blood volume as a result of dilatation of vascular segments (spinal anaesthesia, carotid sinus reflex, etc.) is a less frequent and a less important cause of shock. There is no evidence from the investigation of the cases reported herein that shock as it occurs in the human being is due to a reduction of blood volume resulting from loss of plasma through generally dilated and more permeable capillaries.

The primary aim of treatment is the restoration and maintenance of blood volume with adequate amounts of fluid of approximately the same osmotic value as plasma. The fluid con-

tent of any blood substitute used in the treatment of shock is of no less importance therefore than the structure of the molecule of the protein or protein substitute; for the reason that it is the restoration of reduced blood volume with fluid and the maintenance of the restored blood volume by the use of a substance of the proper osmotic value that is the desideratum of therapy, rather than the use in concentrated form of a substance, whose molecular structure it is considered will attract back into the circulation fluid that is supposed to have escaped through capillaries the permeability of which is allegedly increased. For physiological, therapeutic and practical reasons therefore, plasma and serum as now prepared and used are excellent blood substitutes for the treatment of all forms of shock; for the general treatment of burns they are ideal.

The physical conditions under which the various forms of shock occur, the physiological differences upon which their development depends and the different requirements in therapy of the various forms of shock have been discussed. A consideration of shock and its treatment, however, would not be complete without reference to the environmental conditions under which shock occurs. In certain situations under conditions of war as in combat or target areas or on board ship during a naval engagement, it may be impossible to do adequate or even any blood studies; one will have to determine on the basis of clinical judgment the type of shock and its proper treatment in any given case. Under some conditions such as those just mentioned it may be impossible to treat the patient in shock in the ideal manner, as for example where only plasma or serum is available for the treatment of severe hæmorrhage.

A certain amount of confusion has arisen because of the failure to differentiate between the environmental conditions under which patients in shock could be treated. In civilian practice especially there would seem to be no reason for treating a patient suffering from severe hæmorrhage with only plasma or serum. It is to be hoped that the justifiable enthusiasm for plasma and serum which lately greeted their extended use will not result in the abuse of these worthy substitutes in conditions of shock where whole blood is not only indicated but available.

Finally, the problem of shock, like many other problems in general medicine accentuated

by the war, is one not only of further experimental and clinical investigation but also one of immediate application of existing knowledge. The successful treatment of shock, particularly under circumstances such as may reasonably be expected to occur in connection with the war (explosions and fires in war industries, enemy action, etc.) in which a large number of the casualties will be cases of shock, depends on other factors besides an understanding of the mechanism, diagnosis and treatment of shock. Under such circumstances successful treatment will also depend on whether or not there are adequate supplies of blood and plasma (or serum) immediately available. No modern community would be without a supply of diphtheria antitoxin to protect itself in the event of an outbreak of diphtheria. Blood and plasma (or serum) are as specific in the treatment of shock as antitoxin is in diphtheria. Only through the establishment of blood and plasma banks in the hospitals throughout Canada will the civilian population and members of the armed forces stationed in Canada be assured of an immediately available and adequate supply of 'anti-shock serum'.

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## THE PREVENTION OF EXPERIMENTAL THROMBOSIS BY DICOUMARIN\*

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CAMPBELL AND LINK<sup>1</sup> have isolated from spoiled sweet clover hay a compound which is markedly effective in lowering the concentration of prothrombin in the blood. Ingestion of the compound by animals eating spoiled sweet clover results in a hæmorrhagic condition—the sweet clover disease of cattle. Link and his associates have identified the compound as 3, 3' methylenebis (4-hydroxycoumarin), or "dicoumarin". Bingham, Meyer and Pohle<sup>2</sup> and Butt, Allen and Bollman<sup>3</sup> have recently reported studies of the effect of administration of the compound to dogs and patients. After administration of the compound, no immediate effect is observed, but after 48 hours the plasma prothrombin time had increased considerably. On discontinuing the dicoumarin, the prothrombin returned to normal in from six to ten days. The substance is effective on oral administration.

Link and others have suggested that, as the dicoumarin lowers the concentration of prothrombin in the blood, the substance may be useful in the prevention of thrombosis. This assumes a primary relationship between thrombus formation and the clotting system of the blood. Welch<sup>4</sup> and others (*cf.* Boyd;<sup>5</sup> Silberberg<sup>6</sup>) indicate that the former consists of a conglutination of platelets and is thus distinct from the clotting mechanism, which may be superimposed on it. Hence the assumption that lowering the blood prothrombin will affect thrombosis requires some adequate experimental proof before the material should be subjected to clinical trial. Bingham, Meyer and Pohle were unsuccessful in an attempt to study the effect of the substance on the formation of intravascular thrombi. Methods for the experimental production of thrombi and its prevention by heparin have been reported previously from these laboratories. Similar studies have now been conducted with dicoumarin.

The dicoumarin was administered intravenously to dogs in a single dose of 10 mg./kg. Sixty hours later, when the prothrombin had reached a low level, the animal was anaesthetized

with "ibatal" and the thrombosis produced by mechanical means. In the first series intravascular thrombi were caused to form by crushing the radial or saphenous vein on a linen thread (Murray, Jaques, Perrett and Best<sup>7</sup>). In the second series, extravascular thrombus formation was followed by inserting a glass cell between the carotid artery and jugular vein (Best, Cowan and MacLean<sup>8</sup>). The results are shown in Tables I and II. Prothrombin times

TABLE I.

	<i>Normals</i>	<i>Dicoumarin-treated</i>
Patent.....	1*	11
Partially occluded.....	5	6†
Occluded.....	10	1
Total.....	16	18

The crushed section of vein was removed 2½ hours after crushing, fixed in 10 per cent formalin and examined histologically later.

\*No visible damage of the intima could be seen.

†In the case of 4 of the 6 partially occluded veins, the dogs from which these veins were taken had a prothrombin time of 100 seconds. In all the others the prothrombin time was over 200 seconds.

were determined by the Quick method, using an acetone-extracted rabbit brain thromboplastin. Prothrombin time of normal dogs was found to be 20".

In the first series where thrombosis was produced by crushing the vein, without dicoumarin thrombi resulted in all the veins which had been successfully crushed. In 60 per cent of the dicoumarin-treated animals the veins were completely free of thrombi. Six veins were found to be partially filled with thrombi, but 4 of the 6 veins were from dogs whose prothrombin time was only 100 seconds, compared with over 200 seconds for the rest of the series. In the second series the glass cell was established in 13 dogs (5 normal and 8 dicoumarin-treated). In the control dogs, after two or three cells had been inserted to determine the normal thrombus formation time, 350 units/kg. of heparin were given intravenously. One cell was then inserted immediately and another after half an hour. The time for the first appearance of a thrombus in the cell and the time taken for the flow

\* This study was conducted with the aid of a Scholarship from the National Research Council granted to one of us (U.D.).

TABLE II.

Dog No.	Prothrombin time (seconds)	First appearance of thrombus (minutes)	Blood flow stopped (minutes)
3	19	<i>Normals</i> 2' 5" 2' 30" 1' 25"	12' 30" 13' 30" 10'
6	20	5' 4' 25"	19' 45" 9'
17	21	5' 20" 1' 45" 3'	14' 25" 10' 30" 8' 25"
18	22	2' 2'	14' 9'
19	23	3' 20" 3' 15"	10' 5" 12'
6	...	<i>Heparinized</i> 8' 20" 15'	120' 30'(femoral)
17	...	11'	190'
18	...	6' 45" 14' 30"	191' 114'
19	...	12' 16'	182' 194'
7	460	<i>Dicoumarin-treated</i> 8'	Patent after 214'
11	510	30'	Patent after 270'
13	no clot	15'	Patent after 260'
14	no clot	8'	Patent after 70' (dog died).
15	55	6' 20"	24'
16	...	9'	Patent after 187' (dog died).
20	75	7' 30"	Patent after 360'
21	185	11'	Patent after 450'

through the cell to be blocked are shown in Table II.

In the normal dogs thrombi formed in the cell within a few minutes and grew rapidly until the cannulae and cell were completely blocked. The blood flow usually ceased within 15 minutes. In the heparinized animals, the first-formed thrombi often washed off completely. Thrombi that remained would grow, but large pieces would break off from time to time. After 21½ hours, on an average, the thrombi would begin to grow rapidly and would finally completely occlude the cell. This was due to the gradual disappearance of the heparin from the circulation at this time. Thrombi first appeared in the dicoumarin-treated animals in from 6 to 30 minutes. These would also wash off from their

original point of attachment. None of the thrombi seemed to be firmly adherent except those which would sometimes form on the periphery of the cell. They acquired a smooth surface and did not continue to grow. In all cases, except Dog 15, which did not have a greatly prolonged prothrombin time, no further thrombi formed and the cell remained patent until the animal died under anaesthesia or was destroyed. All the dogs, except Dog 15, had a prothrombin level of less than 5 per cent of normal. Platelet counts were made on some of these animals by Dr. E. Fidler. No marked change from the normal was observed, indicating that the absence of thrombi was not due to a diminution in the number of platelets.

From this preliminary study it is clearly evident that dicoumarin hindered and, in a fair percentage, prevented the formation of extravascular and intravascular thrombi. Its effectiveness paralleled the reduction in plasma prothrombin, with its associated hypocoagulability, and it is therefore evident that thrombus formation is dependent, at least in part, on the clotting system. It is probable that fibrin is the "cement" which holds the individual platelets together. While heparin has been previously shown to prevent thrombus formation, various lines of experimental evidence have suggested that the anticoagulant action of heparin is due to its action in preserving platelets, not the reverse, so that the above is the first experimental evidence of clotting being an intimate part in the mechanism of the formation of a thrombus. Stewart<sup>9</sup> has reported that in two cases of hyperprothrombinemia the patients suffered from recurrent thromboses for no apparent reason.

Link in his studies on rabbits found that the material was relatively non-toxic, as it could be administered without ill effects to rabbits for periods of months. Butt, Allen and Bollman, and Bingham, Meyer and Pohle, also found little toxicity associated with the material. The question of toxicity of the compound should be considered under three separate heads, namely, (1) immediate toxic effects; (2) toxic effects due to the hypoprothrombinemia; (3) delayed toxic effects. There is no immediate toxic effect of the substance in animals. Dogs tolerate a dose of 10 mg./kg. without any apparent discomfort. Bingham and associates have reported definite toxic symptoms with doses of 25 mg./kg. in dogs. This dose appears to be the toxic level

of the compound in these animals and resulted in fever, dyspnoea and coma. The toxic effects due to hypoprothrombinæmia are similar to those reported by many workers for the same condition produced by vitamin K deficiency. With sufficient lowering of the prothrombin hæmorrhages occur. Their location is determined by anatomical and physiological factors which result in their formation in areas where trauma and stress are greatest. Thus, hæmatomas will occur on venipuncture. This can be prevented by continued pressure applied to the puncture site, or by maintaining the prothrombin concentration above the hæmorrhagic level. Delayed toxic effects produced by effective doses are more difficult to determine. Bingham *et al.* reported that their animals showed marked vasodilatation of capillaries, small arteries and veins. We have also observed this in our animals and it merits consideration, as such venous congestion might be a serious complication under certain conditions. At present, no long term toxicity tests have been reported, nor is anything known regarding the mode of action of the material. The fact that 48 hours elapse before the fall in prothrombin occurs strongly suggests that the material interferes with prothrombin synthesis and is therefore acting as a specific poison for the liver cells involved in this activity. This also requires further testing. Link found that his test rabbits could be used many times without any change in their response curve, suggesting that the cells involved may recover completely under certain experimental conditions.

## CONCLUSIONS

1. Intravenous injection of 3, 3' methylenebis (4-hydroxycoumarin), "dicoumarin", increases the prothrombin time of dogs. The administration of this substance in sufficient amounts prevents the formation of intravascular and extravascular thrombi. This demonstrates an intimate connection between the clotting mechanism and the formation of thrombi (agglutination of platelets). Further, it provides an experimental basis for the clinical use of the material to prevent thrombosis.

2. Due to its cheapness, its long action, and the fact that it is active on oral administration, dicoumarin possesses many definite advantages for clinical use in the prevention of thrombosis. The long latent period before its effect is demonstrable and the impossibility of terminating this effect quickly may constitute disadvantages. Before its clinical use can be recommended, further studies regarding its toxicity should be undertaken.

The authors are greatly indebted to Prof. C. H. Best, who suggested the problem to them, also to Dr. C. von Seeman, of the Department of Banting and Best Medical Research, for the preparation of the hæmorrhagic material.

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## SCURVY IN MONTREAL\*

By D. G. CAMERON AND E. S. MILLS

### Montreal

THE presence of two patients suffering from scurvy in the medical wards of the Montreal General Hospital during the winter of 1940-41 supports the belief, widely held, that vitamin C deficiency in a mild form is probably still prevalent. Failure to recognize these cases is due to the fact that patients do not always present the classical clinical features of the disease, even after the stores of the vitamin have been completely dissipated for a long period of time. This is well illustrated by the case of

Dr. Cameron in Boston, who, after placing himself on a vitamin-C-free diet, failed to show any clinical signs of the disease for 13 weeks after the plasma-ascorbic acid level became zero, or 132 days after he had placed himself on the deficient diet.

The patient to be described herein is another example of scurvy in which one of the classical signs of the disease—the gum lesions—was absent, although other features were characteristic and the laboratory evidence quite conclusive.

\* From the "E" Medical Service of the Montreal General Hospital.

## CASE REPORT

T.S., a Russian labourer, aged 60, was admitted to the Montreal General Hospital on February 4, 1941, complaining of (1) swelling and severe pain in the knees, ankles and over the calves for one week; (2) a peculiar discoloration over the shins for the past week.

*Personal history.*—For the past six months the patient had worked at his occupation as a dish washer for only two days a week. He prepared his own meals which consisted of soup made of boiled cabbage and potatoes. At no time did he have any fresh fruit or green leafy vegetables. His history otherwise showed nothing of special interest.

*Present illness.*—The patient was last perfectly well on January 28, 1941, when he became aware of an aching pain in his calves and noticed a red blotchy discoloration over his shins. The following morning both knees, ankles and calves were exquisitely tender and the discoloration was more extensive. He was brought to hospital by a friend on the evening of admission. The pain remained in the regions named, was aggravated by movement or by pressure, even the weight of the bed clothes causing great discomfort. He suffered considerable malaise and felt he had a cold, coughing, and expectorating frequently. He had lost considerable

Microscopic examination of the urine revealed occasional red blood cells, no pus cells or casts. The stool was benzidine-negative. X-ray examination of the chest, ankles, knees, elbows and wrists revealed nothing abnormal. Blood cultures and agglutination tests were negative.

Blood studies showed: red blood cells, 4,210,000; white blood cells, 10,400; platelets, 208,000; haemoglobin, 86 per cent (Hellige); red cell diameter, 7.9 microns; differential: polymorphonuclears, 80 per cent; lymphocytes, 16 per cent; monocytes, 3 per cent; eosinophils, 1 per cent. Bleeding time, normal. Coagulation time—11 minutes (Lee and White; normal up to 10). Retraction of clot, normal. Hess test, positive. Prothrombin, 18 seconds (normal 21 to 23 seconds).

Physical examination was otherwise negative and a clinical diagnosis of scurvy was made. There was no clinical evidence of other vitamin deficiency.

The patient was placed on an antiscorbutic diet and given vitamin P in the form of hesperidin, 1 tablet t.i.d. After 3 days' treatment with the drug there were no new haemorrhages and the old ones were fading. The tender areas in the muscles and the tendo Achillis as well as the joint tenderness and general condition remained unchanged.

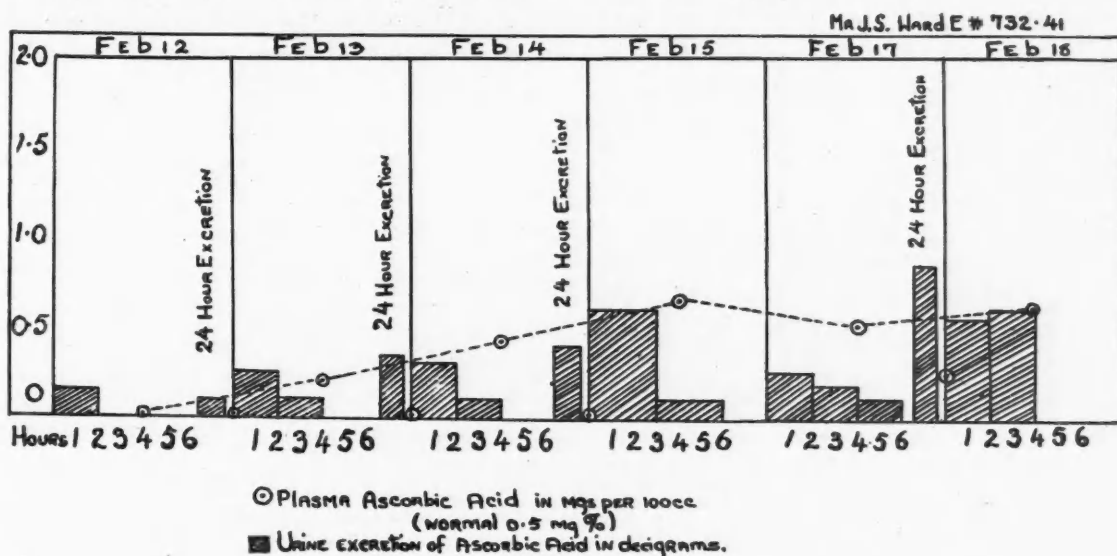


Chart 1

weight during the past year but did not know how much, while for the past month or two he had noticed increasing lassitude and loss of bodily vigour.

*Physical examination.*—Showed an emaciated elderly male who appeared quite ill. His face was sallow and drawn, his eyes deeply sunken and lustreless, his breath fetid. From time to time he coughed up small amounts of thick sputum. Temperature 100.8°, pulse 96; respirations 24. The legs, from ankle to knee, showed a purpuric eruption, which was in some places petechial, in others ecchymotic. Similar less extensive lesions were present on the thighs and over the buttocks, some fresh, others fading. Over the sacrum there was a large ecchymotic area, ulcerating at its centre and surrounded by petechiae. The knees and ankles were tender, and though there was no definite swelling in the joints themselves, there was obliteration of the malleolar hollows and pitting oedema. In the calves and thighs there were numerous tender areas and a few tender sclerotic nodules.

The teeth were carious and there was considerable debris and tartar about them, due to neglect but there was no heaping up of the gums nor did they bleed easily. The blood pressure was 180/100, the heart was not enlarged; no murmurs were heard. Eye movements and pupillary reactions were normal, the fundi were not remarkable.

The urine was clear; specific gravity ranged from 1.012 to 1.016; albumin negative, glucose negative.

The patient's ascorbic acid level was zero as estimated by the method of Mindlin and Butler<sup>2</sup> as was also his urine ascorbic acid level as determined by the method of Evelyn Malloy and Rosen.<sup>3</sup> Vitamin C therapy was started; the patient received 500 mg. of vitamin C (redoxin) each day by the intra-muscular route. Daily estimations of the plasma ascorbic acid level and of the urinary excretion of ascorbic acid were made and are presented in graphic form.

After two days of vitamin C therapy there was marked subjective improvement and the patient was able to increase the range of movement of the limbs without pain. After 5 days the joint pains had entirely disappeared, the Hess test was only faintly positive and there were only a few tender areas remaining in the calves and thighs.

Fourteen days after treatment was started, the patient complained of a chill and his temperature rose to 105°. Physical examination revealed signs of a massive consolidation of the right lung. He coughed up rusty sputum which typed directly for pneumococci, Type XX. The leucocyte count was 19,000.

In spite of full doses of sulfathiazole he died on February 24th.

This patient, presenting all the classical features of scurvy, with the exception of the

gum lesions, is an instance of vitamin C deficiency occurring in the City of Montreal. It is believed to be an exaggerated example of a vitamin deficiency state probably quite prevalent among the poorer classes in large cities. The true incidence of the disease cannot be determined by reference to vital statistics, because clinical features, such as gum lesions, may not be present for months after the ascorbic levels in the blood are zero. The extent to which the disease occurs in mild form can only be determined by an estimation of ascorbic acid absorption and excretion. The more general use of these laboratory methods in diagnosis would seem to be well worth while.

Another feature of the disease which has aroused widespread interest is the etiology of the hæmorrhagic features. Jersild,<sup>5</sup> of Copenhagen, has presented evidence to show that these are due to a deficiency of vitamin P, a crystalline substance found with ascorbic acid in citrous fruits. In order to test Jersild's observations our patient after a suitable control period was given vitamin P, but no ascorbic acid. A prompt disappearance of the hæmorrhagic features was noted, although other features of the disease were unaffected until vitamin C was added. All signs and symptoms rapidly disappeared after the intramuscular injections of vitamin C.

The absorption and excretion studies in the case of this patient demonstrate clearly that it is of the utmost importance in testing for mild degrees of vitamin C deficiency, to study the absorption of the vitamin by estimating the urinary excretion, as the determination of the plasma ascorbic acid level alone is inadequate. As the chart in this case shows, the plasma ascorbic acid level was normal at a time when excretion of the vitamin was well below the normal values, indicating that the stores of the

vitamin in the tissues had not been entirely replenished.

A fact not sufficiently emphasized, and one which explains the prevalence of vitamin C deficiency, is the extreme sensitivity of the vitamin to heat and oxidation.<sup>5</sup> Such vegetables as spinach, cabbage, and turnips, are rich sources of vitamin C. These same vegetables when boiled in open vessels are practically devoid of the vitamin, which accounts for the development of scurvy in this patient, who subsisted almost entirely on a soup made from cabbage and other vegetables. Even crushing and bruising of many vegetables, followed by exposure to air, will cause sufficient oxidation to reduce materially the ascorbic acid content. It is of practical importance that grapefruit and tomatoes retain their ascorbic acid content after canning, although many fruits are rendered almost inert by this process.

Thanks are extended to Mrs. Salter and Dr. Hunter of the Medical Laboratories of the Royal Victoria Hospital, who kindly made the determinations recorded in the graph.

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#### RÉSUMÉ

Un cas démontre l'existence du scorbut présentant tous les signes classiques de la déficience vitaminique C à l'exception des lésions gingivales. Le niveau de l'acide ascorbique sanguin peut être à zéro sans qu'apparaissent les lésions des gencives, d'où l'importance des examens de laboratoire pour dépister le scorbut fruste. La tendance aux hémorragies, causée par un déficience en vitamine P a été observée; or, on sait que la vitamine P accompagne l'acide ascorbique dans les fruits citriques. La vitamine C arrête ces hémorragies. Il faut se rappeler que la vitamine C est très sensible à la chaleur et à l'oxydation; cela explique l'existence du scorbut fruste chez les individus qui font bouillir leurs légumes ou les exposent trop longtemps à l'air. JEAN SAUCIER

Poetry is the record of the best and happiest moments of the happiest and best mind. We are aware of evanescent visitations of thought and feeling sometimes association with place or person, sometimes regarding our own mind alone, and always arising unforeseen and departing unbidden but elevating and delightful beyond expression; so that even in the desire and the regret

they leave there cannot but be pleasure, participating as it does in the nature of its object. It is as it were the interpretation of a divine nature through our own; but its footsteps are like those of a wind over the sea, which the coming calm erases and whose traces remain as on the wrinkled sands which paves it.—Defense of Poetry, Shelley.

## VARICOSE VEINS, SIMPLE, AND COMPLICATED\*

BY L. T. BARCLAY

*Toronto*

FEW procedures in surgery give such uniformly satisfactory results as are obtained in this condition when it is simple, and even when complicated the results are pleasing in the majority of cases.

The essential features in considering a new case are: any intercurrent disease such as cardiac failure, cirrhosis, or pelvic tumour which would contraindicate treatment, or which should be attended to before dealing with the veins; a history of deep phlebitis; active superficial phlebitis, and sufficiency or insufficiency of the valves of the long saphenous vein. Loss of pulsation accompanying arteriosclerosis is not a contraindication to treatment of varicosity, for this will tend to improve the capillary circulation; nor is diabetes, except that ordinary precautions in technique must be redoubled and nothing active can be done in the presence of latent infection.

If there is no contraindication to treatment in the way of systemic disease, in a patient with a history of deep phlebitis, patency of the deep veins may be determined by the Perthe, or tourniquet test. In such cases the majority re-canalize in time.

A soft rubber tourniquet is placed round the thigh at a tension sufficient to obstruct backflow in the long saphenous vein, and mental note is made of tension and distension in the varicose veins where most prominent. With the tourniquet in place, the patient is asked to walk smartly up and down the room for a distance of about one hundred feet. With her still standing, one notes again pressure in, and prominence of the veins; if the deep veins are patent, the varicose veins may be completely collapsed, or at any rate are softer, and smaller. On the other hand, if the deep veins are not patent, the patient will complain of painful pressure before going thus far, and, on re-examination, the reason is obvious in the tenseness of the varicosities.

In the case of a positive Perthe test, nothing remains to offer except elastic support, permanently, or until at subsequent examination the deep veins are proved patent.

If there is no history of deep phlebitis it is necessary next to determine if the valves in the long saphenous are competent. If a negative Perthe test has resulted in fairly complete emptying of the varicose veins, mere release of

the tourniquet followed by a downward rush of blood to distend them is ample evidence of valvular insufficiency. More usually one applies the Trendelenberg test as follows.

The patient lies supine close to the edge of the examining table nearest the limb in question, and the examiner. The limb is elevated, to empty the varicose veins, which are then stopped by firm pressure of the thumb over the long saphenous vein in the thigh; the patient is then asked to sit up and drop the leg over the edge of the table. If sudden release of the pressure on the vein now results in a visible, or palpable wave of blood to again distend the vein, the test is positive and venesection is indicated as the first step in treatment. This is important, for if injection treatment is carried out alone in the face of a positive Trendelenberg sign, not only will many more injections be required to obliterate the veins, but almost all of these patients will be back inside a year with recurrence of most of the varicosities.

This operation of venesection is not an office procedure. It is often quite difficult because of the depth of the vein, for it lies on the deep fascia, and most of our patients are fat of thigh, and because of the absence of practical landmarks; one of the best of these is the faint groove almost always perceptible at the outer border of the short adductor muscles, under which groove the vein will be found. It should be secured close to its junction with the femoral vein, but below the junction of the superficial epigastric to be above the confluence of its medial and lateral branches, or these must be secured separately, because they form arcades with the vein through tributaries at a lower level, which might be the cause for recurrence. Perhaps a more important reason for securing these tributaries is the frequency with which they themselves become varicose. While the patient must go to hospital to make use of the facilities which the operating room provides, it is not necessary that she be admitted, but she may go home directly after operation, and subsequently is ambulant and carries on her duties in so far as she is able.

\* From the Department of Surgery, Toronto Western Hospital.

The upper and inner quadrant of the thigh is shaved; a towel folded lengthwise in thirds is placed in the perineum and the patient keeps this taut by holding both ends, while standing, for the vein to be marked, and by lying on one end and holding the other end tightly when on the table, for one's space is limited. With the patient standing on a chair beside the operating table, the upper part of the vein can usually be palpated, and a mark is made on the skin over it with a cotton applicator dipped in the aniline-gentian-violet stain of the bacteriology laboratory; this is a most satisfactory marking material because the iodine subsequently used for preparation fixes it on the skin. This mark indicates the line of the vein, and the incision may be parallel, or at right angles to it, the upper end almost to the level of the inguinal ligament. The patient now lies down, is suitably draped, and the line of incision and the fat beneath, down to the deep fascia, are anaesthetized with 1 per cent novocaine solution. The scalpel is used only to go through the skin; the edges of the incision are retracted and deeper dissection is done with scissors for in this way, much hæmorrhage is avoided. This is a real advantage, for the vein closely resembles in colour that of the deep fascia with muscle showing through, and the slight difference is obscured by fresh blood. If the vein is not found readily, the incision must be extended and a deliberate search made for it at the foramen ovale, but this is done at the cost of disturbing much fat tissue, with consequent greater chance of infection, and increased post-operative discomfort to the patient; some lymph nodes are frequently encountered in this region. The vein is now cleared for about one and a half inches, again by scissors dissection, and is ligated with plain catgut, doubly above, and singly below, the two about an inch apart, and the vein divided halfway between. The closure is of skin only, by end on mattress suture, and a firm dressing is applied with adhesive.

Throughout the whole treatment our aim is to keep the patient ambulant, and at work as far as possible, so that, unless she is from out of town, and concentrated treatment be desirable to cut down her stay away from home, treatment is graduated to produce the minimum of discomfort and disability, even at the expense of being prolonged over a greater time. Mere ligation of the saphenous vein, by slowing the current will usually produce spontaneous thrombosis well down toward the knee, and this, with the incision, give the patient as much discomfort as she can support and still remain active during the week following operation. For this reason, we do not favour injection of the distal end of the cut vein with sclerosing solution at the time of operation, with the idea of producing a mass thrombosis of the whole varicose system, which, when it occasionally occurs spontaneously, certainly lays the patient up for two or three weeks and is very painful.

We have never seen any occasion for venesection, or excision, of any varicosity other than the high saphenous ligation described above, with the exception of a rare case, where it is desirable to divide the short saphenous below the popliteal space; all residual varicosities after

saphenous ligation are adequately dealt with by proper injection treatment.

A week or ten days after venesection, the patient reports for removal of sutures, and at this time the injection of residual varicosities is started. This follows exactly the same course as the treatment of the simple case where the valves in the thigh are competent, and venesection is not needed.

Several satisfactory sclerosing solutions are available, of which, perhaps, 5 per cent solutions of the sodium soaps of castor, and cod liver oils are best. The first injection is of 0.5 c.c. in the highest moderate-sized varicosity which is patent. The result of this gives one a gauge as to the individual patient's reaction to the solution so that subsequent dosages may be more accurately decided upon. After injection it is most important to keep the patient sitting still for at least five minutes in order to keep the blood flow as slow as possible, so that the sclerosing agent is concentrated in one area to prevent dilution. Even veins the seat of gross pathological change will go into strong spasm after injection and send the solution slowly along the vein in both directions from the point of injection; this spread can actually be followed visually as the veins contract and become quite small. It assures intimate contact of the sclerosing agent with all parts of the intima; there is a smaller clot to be organized and much less discomfort to the patient. This phenomenon is most useful in producing sclerosis of veins which are made out only in a few places, with difficulty, in an œdematous leg.

Subsequent injections are made at intervals of one week. They vary in size from 0.75 c.c. in moderate sized veins to 1.5 c.c. in very large ones, with a total of 3.0 c.c. to 4.0 c.c. at one sitting. In practice, keeping an eye to the comfort and ambulatory of the patient, one rarely makes more than two injections at one time. It is useful to divide thigh and leg, in imagination, into upper, middle, and lower thirds, and ankle, and into anterior, posterior, medial, and lateral quadrants, so that one can chart a given treatment as follows.

November 1, 1941.—Solution x—0.75 c.c. x 2; med. upper 1/3 right leg; med. mid. 1/3 left leg; which gives one an accurate clue to locate the injection for estimation of its results at the next sitting. Injections are made most conveniently with the patient standing on a rather high chair with a railing on three sides of it,

devised by Dr. T. A. J. Duff, Chief Surgeon, Toronto Western Hospital, the operator sitting on a lower chair in front. A satisfactory alternative is for the patient to sit on the examining table with her foot on a low stool, the operator seated on a similar stool in front. In the case of an occasional very large vein, the patient must lie down and remain so during the injection and the rest period following, to empty the vein and avoid excessive dilution, or the same thing may be accomplished by injecting through a metal ring tourniquet, such as a forceps' or scissors' handle pressed firmly against the vein; the tourniquet must be kept in position for a similar period after injection. Tiny spider veins in the skin are only treated for cosmetic reasons and they can best be obliterated, perhaps, by touching them at intervals of about one-half an inch with a very short diathermy spark with, or without, a local anæsthetic.

Leg ulcer, apart from trauma, is the result of a vicious circle of circumstances. Dilatation of the long saphenous, and incompetence of its valves results in a centrifugal flow of blood in it with consequent anoxæmia of the tissues normally drained by this system. Back pressure at the ankle corresponds to a column of blood from the heart to this level, with the patient at rest, for there are no valves in the veins of the chest or abdomen, and with effort, or any other cause for increased intra-abdominal pressure, including adiposity, the back pressure is increased. This embarrasses the capillary circulation, and obstructs the lymph flow. Over a long period the result is loss of hair and other accessory structures of the skin, atrophy of the skin which becomes thin and shiny, and is pigmented from leakage of blood pigments from the capillaries. Oedema from back pressure and obstruction of lymph flow results in repeated attacks of low grade phlebitis and lymphangitis with deposition of scar tissue; the scar tissue contracts and further limits the circulation. The vicious circle continues until the oedematous leg becomes the

contracted leg of callus oedema, and varicose ulcer. These changes are seen in increasing degrees from above down in the leg and ankle. It is unusual to find them in the foot where the circulation is supported by the shoes; the tissues below the deep fascia are perfectly normal. Movements at the ankle may be seriously limited by the contracture of callus oedema.

The intractability of an ulcer under treatment depends on the degree and extent of these changes. In the mild or moderate case, efficient treatment of the varicose veins on the lines described above will cause the ulcer to heal almost miraculously in two or three weeks after venesection, and with only a mild ointment dressing locally. When an ulcer fails to heal with efficient treatment of the veins, or when it is slow to heal, and recurs, it means that there is so much fibrosis in its base that this, and not the varicosity, has become the chief factor in malnutrition of the tissues, and the scar tissue must be removed. The ulcer, the underlying, and the worst of the surrounding tissues are excised in a block down to, and including the deep fascia, and the resulting defect, often very large, is immediately covered with a thick Thiersch or split graft. Unlike the veins the superficial lymphatics do not communicate with the deep ones through the deep fascia; for this reason, an attempt is made to procure such anastomosis by the Kondoleon procedure, which simply consists in excising a strip of deep fascia about one inch wide, from the excised ulcer area up almost to the knee on one or both sides of the leg.

If the above explanation of the causes, and vicious circle of changes leading to ulcer is accepted, it will be clear that supportive measures whether by bandage, Unna's paste, or elastic adhesive have very little application to the treatment of ulcer; certainly any treatment of the ulcer by skin grafting, short of radical excision of scar tissue underlying and surrounding it, must fail, for the mechanism that produced the first ulcer must result in recurrence.

Greatness has in general this manifest advantage, that it can lower itself when it pleases, and has, very near, the choice of both the one and the other condition; for a man does not fall from all heights; there are several from which one may descend without falling down. It does, indeed, appear to me that we value it at too high

a rate, and also overvalue the resolution of those whom we have either seen, or heard, have condemned it, or displaced themselves of their own accord: its essence is not so evidently commodious that a man may not, without a miracle, refuse it.—Of the Inconvenience of Greatness, Montaigne.

## THE TREATMENT OF ACUTE AND CHRONIC SALPINGITIS\*

By A. B. NASH

*Victoria, B.C.*

ALTHOUGH the title of this paper implies that acute and chronic salpingitis may be regarded as distinct entities, they do not often exist as simple inflammatory processes involving the oviduct alone, and it is best to consider them as part of a more widespread inflammatory lesion or as but one manifestation of what is broadly termed "pelvic inflammatory disease". This paper is primarily concerned with treatment, which necessarily differs according to the cause and extent of the disease. It is therefore more convenient to discuss this aspect of the problem according to the various etiological factors.

The most common cause of pelvic inflammatory disease is the gonococcus and therefore gonorrhœal salpingitis requires first consideration.

The gonococcus has a special predilection for mucous surfaces and, for its continued existence, seeks the crypts of the glands lining the genital tract and the subepithelial tissues beneath them. Here, as is so well known, but so seldom appreciated, these organisms retain their infective potentialities for an indefinite period of time, certainly long after all outward manifestations of the disease are gone or are unrecognizable. During the acute and subacute stages of the infection at these sites, the soil is well prepared for the entrance of secondary pyogenic invaders, whose advent is never long delayed and whose presence may later overshadow and obscure the presence of the gonococcus, as it may be determined by clinical stigmata or even by bacteriological methods. Yet it is this very persistence that is so often responsible for the occurrence of exacerbations and reinfections which are, together with the secondary invaders and the inflammatory changes resulting from their presence, the cause of the ultimate characteristic lesions which result in suffering and loss or impairment of function.

In no other part of the genital tract are these consequences more serious than as they affect the Fallopian tubes, since the characteristic inflammatory changes are productive of pain and

suffering in both acute and chronic stages and the effects of both tend to destroy the patency and consequently the function of these all important lines of communication between the birthplace of the ova and the site at which they may, when fertilized, fulfil the ultimate and, after all, the only important function for which the whole genital tract exists. When this line of communication is broken or interrupted, the whole complex anatomical structure and physiological mechanism is rendered completely useless. Thus, it is evident that the chief object of treatment should be directed toward the preservation of this function by the maintenance of the patency of the Fallopian tubes. It is entirely likely that, if this end is attained, the patient will suffer no other serious or permanently harmful consequences.

It is indeed no evasion of the issue nor confession of inability to successfully treat the existent disease, to suggest that the most easy and effective form of treatment is prevention. By this I do not necessarily mean the prevention of infection with gonorrhœa, since that particular problem is beyond the scope of this paper. I do refer more specifically, however, to the prevention of the extension of existing gonorrhœal disease to the upper genital tract. Herein, it seems to me, in spite of newer and probably more effective methods of treatment, lies the greatest hope of good results and of preservation of function. In this observation there is nothing whatever original, since it has long been recognized that the lack of certain precautions or the employment of certain so-called methods of treatment may, in the presence of known gonorrhœal infection of the lower genital tract, very definitely increase the incidence and even the seriousness of upper genital tract infections. In this particular regard, it is to be feared at the present time that the apparent effectiveness of recent therapeutic measures tends to encourage a certain degree of carelessness with respect to the hazards which I mention. I refer, of course, to the use of sulfonamide group of drugs, whose importance and usefulness I would not presume to deprecate, but whose advent upon the scene does not, in my opinion, in any

\* Read at the Seventy-second Annual Meeting of the Canadian Medical Association, Winnipeg, June 26, 1941.

way minimize the danger of certain other procedures which have been in the past and, I fear, are still employed in treatment; nor do they in any way detract from the importance of and necessity for certain precautions which should be employed in all cases of lower genital tract infection to aid in the prevention of its upward extension.

This end is likely to be attained in the majority of cases if it is remembered that in all cases of early acute infection of the lower genital tract bed-rest should be insisted upon as an essential to proper treatment and that the success of any other therapeutic measures is likely to be seriously prejudiced by the lack of this precaution. It must be further emphasized that examination and instrumentation must be limited strictly to that required only for the establishment of the diagnosis, after which the passage of a speculum, or the direct application of medication by any means to any accessible part of the genital tract will not only fail to influence the course of the disease favourably, but will definitely enhance the likelihood of its upward extension and the occurrence of tubal involvement.

Because of the apparently prompt efficacy of the sulfonamide drugs in modifying and abbreviating the acute manifestations of the disease in the lower genital tract, it does not follow that these precautions may be safely neglected and it is indeed questionable whether, under any circumstances, their use has appreciably minimized the incidence of salpingitis. This apparent fact leads to the conjecture, in support of which there seems to be other evidence, that such early disappearance of the usual manifestations of infection is perhaps an unreliable and even misleading criterion of cure and that although the infecting organisms may be modified and even attenuated, they may well persist and retain their subsequently infective potentialities in the deeper recesses of the myriads of microscopic glands lining the genital tract.

Whereas it may appear superfluous to refer to obviously simple precautions, it seems that the frequency with which they are neglected or overlooked suggests that their true importance is not fully appreciated and I accordingly have no hesitation in emphasizing the necessity of instructing any female patient with gonorrhœal infection as to the very real dangers associated with failure to avoid sexual intercourse and

excitement, alcohol, exposure to cold and damp and, particularly, undue fatigue or physical exertion, especially at or near the time of a menstrual period. It cannot be denied, I am sure, that these are very real factors contributing to the occurrence of salpingitis, the hazards of which are not, in my opinion, appreciably minimized by the newer therapeutic measures, whose arrival upon the scene seems, unfortunately, to have encouraged a certain recklessness and disregard for these precautions.

The occurrence of acute gonorrhœal salpingitis is, though serious, by no means a reason for an attitude of hopeless discouragement with respect to the future physical welfare of the patient or toward the even more important question of preservation of the child-bearing function.

In this connection it is again necessary to re-emphasize the importance of the less spectacular and apparently negative therapeutic measures, whose very simplicity apparently detracts from their popularity and a true recognition of their proper worth, either in their own right or as complementary to other measures.

Even though it has long been recognized and has recently been clearly emphasized by Curtis<sup>3</sup> and others, I do not think that it is generally appreciated that acute gonorrhœal salpingitis has a very definite inherent tendency to undergo spontaneous resolution, provided that the initial infection is given a reasonable opportunity to subside and that subsequent re-infections or exacerbations are not superimposed upon it. Although this tendency to self-limitation by spontaneous resolution is not by any means invariably attended by preservation of the patency of the tube, I think it is fair to suggest that in the realization of this possibility lies the only practical hope of maintaining the fertility that will almost inevitably be lost as the result of subsequent inflammatory episodes. Thus again, in spite of the gonococcal effects of the sulfonamides and their apparent virtue in ameliorating or abbreviating the course of the disease, their employment in no way minimizes the importance of those other measures which diminish the likelihood of exacerbations or reinfections from within or without; and this remains true even though these drugs themselves are doubtless of considerable value in this particular regard. Again, the value of

one is complementary to the other and the efficacy of either alone is no argument or reason for the omission of the other. These prophylactic precautions to which I refer are, of course, identical with those enumerated with reference to the prevention of salpingitis. None, however, is quite so important as bed-rest, maintained for several days after the subsidence of fever, pain, leucocytosis and increase in the sedimentation rate above a normal level. This too should be reinstituted as an added and necessary precaution prior to, during and after the succeeding two or three menstrual periods, whose tendency to produce exacerbations cannot be exaggerated.

Since the patient with acute gonorrhœal salpingitis has also acute pelvic peritonitis, it must be remembered that such measures as the semi-Fowler position, soft diet, and avoidance of purgation are of some value in preventing the aggravation of this condition. So too is the comfort of the patient of some importance, as there is, as a rule, a considerable amount of pain or discomfort in this disease. Symptomatic relief is often gained by the application of ice-bags to the lower abdomen and by use of aspirin and codein. The relief of rectal tenesmus, if present, is usually obtained by the use of tincture opii or some such preparation.

It is probably necessary to close the consideration of acute gonorrhœal salpingitis by the observation that surgery has no place in its treatment. To this suggestion, almost no exception can be made, since it seems now to be an established and acknowledged fact that the natural tissue defences, when given a favourable opportunity, can do a very much better job of repair.

Consideration should perhaps be given to the suggestion made by some authorities that heat therapy, such as Elliott heat treatment should be employed in the acute phase of this disease. It would seem that the proponents of this suggestion are in the minority and that enthusiastic reports as to a shortened and ameliorated acute stage have not been abundantly confirmed. I have myself had no experience in its use, but am inclined to the opinion that it is probably not without risk and that the results which it would seem to produce hardly seem to justify whatever risk it may involve.

The transition of acute gonorrhœal salpingitis into a subacute or chronic form is, to my mind a tragic, but not necessarily hopeless, oc-

currence. It is tragic because it so often occurs when it might have been prevented and because it so often follows upon mistaken and over-enthusiastic attempts to effect a cure of a much less serious form of gonorrhœal infection and it is apt to be hopeless because it may well lead to chronic invalidism from pain and disability, to serious disturbance of the menstrual function, or to absolute sterility and finally to the sacrifice, by surgery, of the main genital organs and all their major and minor physiological functions.

In the great majority of cases this occurrence is inevitably attended by occlusion of the Fallopian tubes, more likely to be permanent than fortuitously temporary, and there can consequently be little hope of any form of treatment at this stage retaining or retrieving fertility. Thus is the ideal objective of treatment sacrificed before the offensive is begun. Whatever measures are employed can only therefore be expected to prevent or minimize the duration and extent of the inflammatory process with regard to its other subsequent effects, such as pyosalpinx, hydrosalpinx, tubo-ovarian abscess and pelvic peritoneal adhesions with their characteristic deformities, usually involving partial fixation of the adnexæ and of the uterus, often with retrodisplacement of the latter. These lesions are usually accompanied by some inflammatory involvement of the ovaries, whose function is consequently disturbed, thus adding to the subjective misery of the patient, whose complaints of pelvic pain, backache, premenstrual congestion, dysmenorrhœa, menorrhagia and prolonged menstruation are often semi-invalidating in degree. The disease has now taken its toll of function, the damage has now been done, and the most that can be hoped for from its treatment is the amelioration of these clinical symptoms; the relief of pain and misery, but not the restoration of function. From none of the measures at present at our command can prompt or spectacular results be hoped for. They are frequently most disappointing and, in any circumstances, their application is apt to be prolonged and to demand the utmost in patience on the part of both patient and medical attendant. Often the disease will slowly and painfully "burn itself out", possibly in spite of and not because of the treatment employed, but the effects will frequently remain and relief can then only be obtained for the patient by surgery of the most radical kind.

By these remarks it is not meant to imply that such treatment is necessarily futile, or that it should not be attempted, even though it may be frequently disappointing. Often its results are apparently most successful, even spectacular, and one is then tempted to conjecture whether perhaps gratification and over-enthusiasm may not prompt an over-generous allocation of credit to the therapy and an inadequate appreciation of the natural healing processes of the affected tissues. This conjecture is perhaps strengthened by broader experience involving failures and disappointments and by a careful study and consideration of the histopathology of these lesions.

Whatever method of treatment is employed, its effectiveness will be minimized by physical exertion, fatigue, alcohol and sexual stimulation. In my own small experience, the sulfonamide drugs are of limited value in the truly chronic salpingitis or pelvic inflammatory disease of gonococcal origin. Various forms of locally or generally applied heat treatment are apparently not without some merit. Of these, fever therapy is perhaps the least utilized and is the most hazardous. The basis of its use is the lethal effect of relatively low temperatures upon the gonococcus without simultaneously damaging effects upon the tissues. It is expensive, its application requires considerable technical skill, and it is most time-consuming. More important, however, is the fact that it is not without risk, several deaths having been reported in connection with its use.

Elliott heat treatment and inductothermy are more simple of application and, with reasonable minor precautions, neither is attended by any appreciable hazard. My own experience prompts the suggestion that, of the two, the former is most efficacious. Either is probably helpful only as a stimulus and fortification to the natural tissue reaction in dealing with any inflammatory process and not because of any possible specific lethal effect upon the gonococcus.

The value of the once popular non-specific protein therapy is assuredly small and its use, at the present time, seems to have few proponents.

It seems that time, patience and the avoidance of re-infections and aggravating influences are, perhaps, the most important considerations in the treatment of this disease. None are easy to employ or to enforce. They are not spectacular

in their effects. Their value is not, I think, adequately appreciated and they are consequently seldom employed to the full extent of their usefulness. If so utilized, they will materially enhance the efficacy of the other measures discussed and they will accordingly minimize the likelihood and necessity for more radical treatment.

If, after a prolonged and adequate trial of all recognized and reliable forms of conservative treatment, the patient still suffers from the effects of this disease, it cannot be denied that the necessity for possible surgical measures must be given consideration. This consideration, however, should not be even entertained, much less adopted, unless it can be clearly established that the inflammatory process is no longer active. If this precaution is not taken, surgical intervention is most likely to re-activate infection and the post-operative course will, in consequence, be seriously complicated and the outcome may well be fatal. The measure of possible activity can best be taken by comparative observation of symptoms, fever, leucocytosis and sedimentation rate before and after menstruation, provocative pelvic examination and the application of heat to the pelvis.

When surgical measures become necessary they should not, in my opinion, be regarded as a means of treatment of chronic or persisting salpingitis, in the proper sense. Rather should they be considered as a means of relieving or eradicating the damaging effects which the disease, itself now quiescent or terminated, has produced. In this regard I think it is fair and accurate to state that any attempt to treat chronic salpingitis and its associated lesions by excision of the organs in which the infection is present and *active* is both unwise and unlikely to be successful.

A description of the surgical measures to be employed, or of their indications, except in general terms, is beyond the scope of this paper. It may, however, be said that, in most instances when surgery is once undertaken every care should be taken to assure that it is adequate. It has been suggested, I think very sensibly, that inadequate or so-called "conservative" measures are apt to be more radical than the so-called "radical" procedures, in that they seldom produce a cure and often lead to the subsequent necessity for further operation and its attendant increased hazards. It must, for example, infrequently be the case that operation

is justifiable if it is expected that a cure can be effected by simple removal of one or both tubes and even so there is perhaps no better example of inadequacy than the removal of an affected tube without the excision of its interstitial portion, at which site a persisting nidus of infection will, in all probability, give rise to much future trouble. Particularly is salpingectomy alone insufficient when there is reliable evidence of involvement of one or both ovaries, the conservation of which is likely to be a radical measure in itself and to lead to unsatisfactory results in the form of major aberrations of the menstrual function, unjustified even by the hope of pregnancy. The necessary sacrifice of both ovaries in such cases should prompt very serious consideration as to the advisability of removing the uterus as well. In such cases the cervix is usually chronically infected and a total hysterectomy is therefore best performed. It cannot be denied that an operation of such extent can accurately be termed radical, yet, as judged from the point of view of the patient's subsequent welfare, it may well be regarded as more conservative in most cases than a more incomplete procedure.

These decisions as to the extent of the surgical treatment undertaken are often most difficult and their proper solution is largely dependent upon the judgment born of considerable experience and no small amount of pathological knowledge, especially as it applies to living structures in the pelvis. These qualifications are not commonly found and they are as important in deciding when and if to operate as they are in determining the extent of the operative procedure. It is my definite impression that the commonest surgical mistakes might be summed up in the phrase "too little and too soon". I know of no valid contradiction to the statement made by Pelouze<sup>11</sup> to the effect that "the longer an operation can be postponed, the less likely is it to be required".

Acute and chronic salpingitis of the pyogenic type usually results from puerperal or post-abortive infection. It less commonly follows upon instrumentation such as dilatation and curettage, cauterization of the cervix for chronic cervicitis or the misguided use of intrauterine pessaries such as are infrequently employed for contraceptive purposes. This condition can hardly be regarded or discussed as a separate entity and must, of necessity be considered as but an incidental manifestation of a type of

pelvic inflammatory disease, the more important and serious features of which have to do with the inflammatory changes which it most commonly produces in the pelvic lymphatics, the parametrial cellular connective tissue, the pelvic veins and the pelvic peritoneum. As a rule it affects the Fallopian tubes only in an incidental manner and its effects thereon are generally limited to their serosal and muscular coats. Seldom are they alone affected to any serious extent if there is not simultaneous involvement of the other structures enumerated, and the inflammatory changes in the latter far exceed in importance any effect upon the tubes, both with regard to the immediate consequences of the acute stages of the disease or the remote effects of the chronic phase. It does not therefore seem possible to discuss the treatment of acute or chronic salpingitis of this type, except as a minor part of the more widespread pelvic inflammatory disease of which it is a part. Such an undertaking is admittedly beyond the scope of this paper and cannot be properly undertaken at this time.

Certain instances probably do occur, however, where the tubes may be chiefly and primarily affected, as, for example, that in which there is an adjacent acute appendicitis, suitable treatment of which alone is all that is required or indicated so far as the tube is concerned.

It is in this type of infection that the sulfonamides will probably prove their greatest usefulness, so far as the female pelvic viscera are concerned, particularly by the prevention, limitation and curtailment of the acute stage. Surgery has little application to its relief, except for the evacuation of localized collections of pus, in the presence of which the condition of the Fallopian tubes is apt to receive or require little or no consideration.

The incidence of tuberculous salpingitis is greater, I think, than is commonly appreciated. It is generally considered to comprise about 5 per cent of all cases and the matter of its treatment therefore assumes a considerable importance. Especially is this true in view of the fact that there seems to be remarkably little unanimity regarding the subject. It appears that, with a few notable exceptions, no considerable amount of attention or study has been recently devoted to this problem.

Before proceeding to discuss the question of treating tuberculous disease of the tubes, I think it best to clearly exclude from consideration the

incidental and superficial, even though widespread involvement of those organs in cases of generalized tuberculous peritonitis, and to confine attention to that type of case where the tubes, either alone, or in association with other genital organs, are primarily affected.

There seems little doubt that in patients in whom there is simultaneous well-marked or extensive pulmonary disease, the treatment of the pulmonary lesion takes precedence over that of the genital lesion, which assumes a status of secondary importance. In such patients pelvic surgery is probably contraindicated, at least until and if the pulmonary disease is arrested or cured.

It seems too that no authority is prepared to minimize or disregard the importance in genital tuberculosis of the general measures which are usually employed in the treatment of all forms of tuberculosis. These may, perhaps, for the purposes of this discussion be grouped together under the term "sanatorium treatment" and by some their value and importance is particularly emphasized, especially when employed after operative treatment has been carried out. Whereas the value of heliotherapy, as part of such treatment, is generally stressed, it is, apparently not altogether without possible danger unless expertly employed.

There at present seems to exist, if not a controversy, at least a wide variance of opinion as to the merits and applicability of x-ray therapy in these cases. Just as there are advocates of conservative and radical surgery, so are there those who favour mild and others who recommend intensive therapy, with the proponents of the former probably in the majority. The applicability of this form of treatment is limited by the fact that accurate diagnosis is often not established until the time of operation and surgery will then have intruded upon its field of usefulness, except insofar as it is often of definite value post-operatively and may even then enhance the beneficial effects of surgical treatment. It is apparently of definite value in aiding the closure of post-operative fistulae, though it is claimed by some that sanatorium treatment alone will achieve the same results.

So far as surgical treatment is concerned, most authorities agree that its use is indicated in the majority of cases, the contra-indications being co-existence of pulmonary tuberculosis or extensive peritoneal involvement and, of course, any general contraindication to the perform-

ance of laparotomy. The vaginal approach to the pelvis should be avoided for obvious technical reasons as well as the fact that it is likely to result in fistula formation.

As has already been remarked, the diagnosis may not be established or even suspected until the abdomen has been opened and even then the true nature of the disease may well be overlooked, since the lesions are not by any means always characteristic.

When the disease is recognized, a difficult problem arises as to the extent of surgical procedure to be undertaken. Some authorities advocate relatively limited or "conservative" excision. Many others, probably the majority, advise the radical extirpation of the internal genitalia. Since the cervix is seldom involved, its removal is usually not considered necessary as part of the radical treatment. Superficial surface implantations should not be considered in forming judgment as to the extent of excision. Involvement of the ovaries, however, to any appreciable extent, should indicate their removal. The extent of any contemplated or desired operative procedure may well be limited by the extent and characteristic density of the adhesions present and, because of the difficulty of finding a suitable line of cleavage and the necessity for sharp dissection, injuries to adjacent viscera are an ever-present and very real hazard.

Whereas the dangers of drainage are generally emphasized as being likely to result in the formation of fistulae and secondary peritoneal infections, some few authors do recommend the use of rubber tube drains when localized collections of pus are encountered. This advocacy certainly does not enjoy widespread approval.

The arguments of those who support radical surgery are apparently convincing and it seems that their results, although these are difficult of comparison, are superior. It is difficult to contradict or refute the contention that the extent of the disease cannot be accurately estimated by gross appearances and pathological evidence tends to confirm that it is more widespread than such would generally indicate. Then, too, it cannot be denied that the loss of the uterus is much less catastrophic in association with the inevitable sacrifice of the tubes than would otherwise be the case and the argument is further strengthened if there is involvement of the ovaries necessitating their loss. Even in the absence of that necessity, however,

it is not infrequently the case that the patient has been amenorrhœic for some time and the loss of the menstrual function is something to which she has at least become accustomed, even though she may not yet have become reconciled to it. The preservation of the reproductive function does not enter into the argument, since, in the vast majority of cases, tuberculous salpingitis is bilateral and the patient has, in consequence, been robbed of that function by her disease long before the treatment is undertaken.

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## CONTROL OF PHYSICAL HAZARDS OF ANÆSTHESIA\*

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PROGRESS towards the solution of problems involving the prevention of explosion occurring during the administration of anæsthetics by inhalation has been slow. It has been known for many years that the hydrocarbon anæsthetics form explosive mixtures with oxygen. Greater attention has been paid to this hazard since the introduction of ethylene and cyclopropane, although statistical studies reveal that the use of ether and oxygen is insignificantly less dangerous.

The question of relative hazard is of less importance than is the realization that every person involved in the administration of anæsthetics should fully appreciate the risk. Each individual entering an operating room should be consciously alert to the hazard. Irrespective of all safeguards that may be promulgated, we must be unrelentingly vigilant in the application of them. Greene<sup>1</sup> in an analysis of reports of 230 fires and explosions found that 70 per cent of these explosions and 60 per cent of the deaths of patients were caused by igniting agents other than static, and were completely preventable by measures known at the time of

their occurrence. Sixty-three combustions were ignited by static electricity and in no instance were all of the safeguards, which were known and recommended, in use at the time. Because it has been recognized "that the behaviour of human beings is uncertain compared to the constancy of behaviour of materials and mechanical agents",<sup>2</sup> the ideal plan for safe practice should require a minimum of conscious effort in daily application; nevertheless, it cannot be emphasized too strongly that the factors which contribute to the hazard should be fully understood. The purpose of the correlated safeguards which have been devised to meet these hazards should be equally well understood.

The occurrence of explosions and the factors associated with them have been reported by many authors.<sup>3, 4</sup> Exceedingly valuable information has been obtained by means of questionnaires,<sup>5</sup> and an appreciation of the problem has been gained.<sup>6, 7, 8, 9</sup> Safeguards were evolved but were applied in rather haphazard fashion. Explosions continued to occur. Morrill<sup>10</sup> following his survey and basing his calculation on the rate of one explosion per 6,336 of bed capacity per year estimated the occurrence of 74 explosions in the United States in 1939, a total fatality (1 fatality per 5.5 explosions) of between 13 and 14. Within

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the last two years, a well coordinated experimental program has been put into operation by Professor J. Warren Horton<sup>11</sup> at Massachusetts Institute of Technology. Other institutions and individuals<sup>12, 13</sup> have conducted meritorious investigations and have reported their results. Sufficient data have been obtained to warrant collection and coordination of the information. Underwriters' Laboratories, Incorporated and the National Fire Protection Association have become interested in these problems. A meeting was held at the headquarters of Underwriters' Laboratories, Incorporated in Chicago in October, 1940. Decision was reached to appoint a committee of technicians to formulate recommended safe practices for operating rooms. This Conference Committee met in December, 1940, to undertake this project. The report has been prepared and was submitted by the committee to the National Fire Protection Association for its consideration at the meeting in Toronto, May 16, 1941.

The aim of the Conference Committee has been to specify conditions that are in the light of present knowledge ideal. Study reveals that the greatest degree of safety can only be secured by a co-ordinated set of recommended practices rather than by the application of individual and unrelated safeguards. Accumulation of information within one publication will be an aid to architects, contractors, building inspectors, maintenance engineers, superintendents of hospitals, surgeons and anæsthetists. Standards of the National Electrical Code<sup>14</sup> are accepted and there is no intention to supersede them.

*Hazardous locations.*—In order to establish criteria for safe practice it first is necessary to define the term "hazardous location". A room in which any of the hydrocarbon anæsthetic gases or any of the ether compounds are used or stored is considered a hazardous location and should extend for a horizontal distance of 10 feet and to a height of 7 feet above the floor outside any door opening into such a room. In a properly ventilated operating room, the hazardous condition may be considered as extending to a height 7 feet above the floor. This limitation of a hazardous location is deemed reasonable because all explosive anæsthetic agents with the exception of ethylene are heavier than air when in their gaseous state.

*Ventilation.*—In order to maintain efficient mechanical ventilation, windows in hazardous locations should be kept closed. The aim is to

prevent pooling of anæsthetic agents in concentrations that are explosive. For this purpose it is necessary that there be a change of air of not less than 20 cubic feet per person per minute and in no case should it be less than 12 changes per hour. To provide for this change of air, circulating fans placed in inlet ducts near the ceiling will maintain a positive pressure in the operating room and thus tend to lessen air-borne infection introduced from the corridors. Because all anæsthetic agents, except ethylene, tend to pool near the floor, openings into outlet ducts should be placed close to the floor. Motors of an approved type should be installed outside the ducts.

The temperature of an operating room may be governed on the basis of the well-being of the patient and personnel. The degree of humidification necessary to dissipate static charges is a matter of controversy. The "International Critical Table" states that electrical charges are dissipated at a relative humidity of 50 per cent or above. The National Fire Protection Association advises maintenance of a relative humidity of 55 per cent. Explosions have occurred with the relative humidity in an air conditioned atmosphere at 65 per cent. The diversity of opinion and experience is due to a failure to recognize the rôle which carbon dioxide in the atmosphere plays in dissipating static electricity. With an excess of carbon dioxide present the relative humidity may be reduced to 30 per cent without accumulation of static occurring. With the atmosphere washed and depleted of carbon dioxide, accumulation of static electricity may occur when the relative humidity is 65 per cent. Further research will be necessary to establish relationships between temperature and humidity and the accumulation of static electricity. In this work the conditions under which the patient suffers the least loss of heat will of necessity be considered. It may be stated that the highest humidity commensurate with the comfort of the personnel in the operating room should be maintained and preferably it should be over 55 per cent.

*Electric power circuits.*—All electrical installations and equipment should comply with the standards set for Class I Group C locations in Chapter 5 Article 500 of the National Electrical Code issued in November, 1940. Circuits in the modern operating room should be fed by an insulating transformer installed outside the hazardous location. Both sides of the secondary

circuit should be ungrounded. The voltage across the ungrounded circuit should not exceed 115 volts. This ungrounded circuit should be provided with a ground contact indicator connected to operate a red light when either side of the secondary circuit is connected to ground. Warning would thus be given when any hazardous defect in wiring or equipment occurred. One short circuit may occur without the occurrence of a spark in a hazardous location, the warning light goes on, and if a second short circuit does not occur before the defect is repaired, no flash will occur in the hazardous location.

All wiring should be of the approved three-wire type, with all housings being grounded by the third wire. This method of installation is almost universally employed for permanently installed equipment but unfortunately, it is rarely employed for portable apparatus. Detailed specifications for the installation of electrical wiring and equipment in hazardous locations are outlined in the National Electrical Code. "Rigid conduit with threaded explosion-proof joints and explosion-proof fittings shall be employed as the type of wiring". (Section 5014). "Receptacles and attachment plugs shall be so connected that the plug cannot be removed while the switch is in the "on" position, or approved devices in which the circuit is broken in an explosion-proof enclosure shall be used". (Section 5023). Such receptacles provide for a connection for the grounding conductor of the portable cord. All lighting switches should be of the double pole type and should open on both sides of the ungrounded circuits which they control. Mercury switches are not satisfactory unless enclosed in a flame-tight housing and operated by a control passing through a flame-tight stuffing box. Switchboards, panels and service equipment should be installed outside hazardous locations. Motors and generators should be of a type approved for use in explosive atmospheres. Belting used in connection with motors and suction apparatus should contain sufficient conductive material to prevent the development of electrostatic charges.

*Low voltage circuits.*—In any location, all electrical apparatus which is frequently in contact with the bodies of persons should be operated on a voltage of not over six volts. Power may be supplied from individual transformers connected to an outlet receptacle by accepted means or, preferably, by a common

transformer installed in a non-hazardous location. Power also may be supplied from individual batteries made up of dry cells. Receptacles or attachment plugs used on low voltage circuits should be of a type which does not permit interchangeable connection with circuits of higher voltage. All hot wire cautery apparatus should be operated on voltages of six volts or less and cautery equipment of the hot-wire type or of the radio frequency type should be used only in the absence of inflammable anaesthetic agents.

*Lighting fixtures.*—Lamps in fixed position should meet the standards of the National Electrical Code, and therefore, should be enclosed as described for explosive atmospheres and should be protected by metal guards where exposed to breakage. In operating rooms fully ventilated, an exception may be made for lights having no openings, permitting the passage of vapour, that may be brought within seven feet of the floor.

Portable lamps should be totally enclosed and adequately protected against breakage. They should not be equipped with switches but should be turned "on" and "off" at an explosion-proof outlet. The flexible cord should be of a type designated for hard usage and should frequently be inspected for signs of wear. Frayed or worn cords should be replaced.

*Electrostatic discharge.*—Horton<sup>11</sup> has said that "every spark is a manifestation of a natural tendency of an electrostatic discharge to distribute itself in such a way as to bring adjoining conductive surfaces to the same potential". To prevent sparks between conductive bodies it is, therefore, necessary to provide an effective pathway for potential equalization. If all bodies in an operating room are conductive and are coupled, no spark can occur between them. The problem is to supply conductors to ground. Since static is produced by friction and since every movable object in an operating room is in contact either directly or indirectly with the floor, the prime object is to provide a floor that is highly conductive and directly connected to ground. The next step is to be certain that every object in an operating room has a freely conductive path to that floor. Satisfactory conductive rubber flooring material has been developed. A standard method for testing the performance of such a floor has been developed. The resistance between the testing electrode

and ground for any position of the electrode on the flooring surface should be not more than 10,000 ohms. Furniture coming in contact with this floor should be constructed of metal or of other electrically conductive material. Surfaces on which movable objects may be placed should be without paint or lacquer or other insulating finish. All rubber used for castors, tires or leg tips should be of the conductive type. The coverings of all operating tables, stretcher pads, pillows and cushions should be made from sheeting of conductive rubber rather than from the non-conductive type now generally in vogue. It has been established that conductive rubber of this nature should have a surface conductivity of not less than ten micro-ohms per square centimetre and a longitudinal resistivity of not more than 10,000 ohms per centimeter square. The same criteria should hold for all rubber parts of anæsthetic equipment such as masks, breathing tubes, breathing bags and gaskets as well as all suction and pressure tubing not confined within a metallic sheet.

*Conductive shoes.*—In order that the personnel of the operating room may have effective conductivity to ground, shoes should have conductive soles. In order to protect the wearer against the hazard of a short circuit occurring in the electric power circuit, it has been established that the resistance between a metal electrode placed inside the shoe and making contact with the inner sole, equivalent in pressure and area to normal contact with the foot, and a metal-making contact with the bottom of the outer sole, equivalent in pressure and area to normal contact with the floor, shall be not more than one hundred thousand ohms. Because the under surface of soles is apt to become covered with a layer of powder or wax, shoes should be tested on the wearer at least once each day that they are worn in a hazardous location. A suitable testing device for this purpose has been designed and the calibrations have been approved by the National Fire Protection Association. Shoes having nails which may come in contact with the floor should not be permitted in hazardous locations. Shoes meeting these specifications are now in the process of development. It is hoped that they will be on the market soon.

*Intercoupling.*—If floors in operating rooms were made conductive and were maintained at ground potential, if all operating room furni-

ture were in electrical contact with such a floor, and if all persons entering operating rooms were forced to wear conductive soled shoes, it would seem that ample protection against static discharge would be provided. Until hospitals are able to provide these facilities, a simple method of intercoupling patient, operating table, anæsthetist, and gas machine at ground potential, as suggested by Woodbridge, Horton and Connell,<sup>15</sup> may be used. All connections should be made before administration of an anæsthetic is started and they should be maintained until after the mask has finally been removed.

*Miscellaneous safeguards.*—Other precautions against accumulation of static electricity should be maintained.<sup>16</sup> Patients should not be moved from one room to another while an inhalation anæsthetic is being administered. Persons or objects outside an intercoupled system should not be allowed within the region of possible escape of explosive gases without first making contact with one of the group in the intercoupled system at a point remote from the danger zone. Woollen blankets should not be permitted in operating rooms. Cloth covers should not be used on gas machines, because a static discharge might occur when they are removed. The use of a sponge rubber cushion, unless the rubber be conductive, on the stool used by the anæsthetist should not be permitted. The new shark-skin uniforms, because they are such effective generators of static electricity, should never be allowed in an operating room. Oil should never be used on regulating valves controlling oxygen under high pressure. It is false economy to take the risk involved in filling small tanks with oxygen from a large tank.

The conductivity of tile and terrazzo flooring in older hospitals may be increased by washing it each day with a solution of calcium chloride in from 2 to 4 per cent concentration. Drag chains on all furnishings providing contact with such a floor should be of bronze rather than of iron or steel. In order to ensure constant contact, a drag chain should be made from a group of individual chains and a major portion of the loop should be in contact with the floor.

The carbon dioxide absorption method of administering anæsthetic agents possesses advantages. Moisture exhaled by the patient soon provides a high humidification of the gases that

are being employed. With the closed system, explosive gases are not constantly blown out into the room, to come in contact with various sources of ignition. These advantages are nullified if other measures against the hazard of explosion are not maintained, because an explosion occurring in a closed system is much more likely to be fatal to the patient than is one with an open system where the pressure pulse is not directed down the trachea. The anaesthetist should wash the masks and breathing tubes before they are used in order to provide a film of moisture which will be conductive. The breathing bag should not be removed from a gas machine while it contains explosive mixtures. Flushing inflammable gases from the machine with oxygen is dangerous.

It has been shown that it is possible to maintain anaesthesia with mixtures of gases that are outside the explosive range. For this purpose cyclopropane, helium and oxygen may be employed in concentrations suggested by Jones, Kennedy and Thomas.<sup>17</sup> Hass, Hibshman and Romberger<sup>13</sup> have suggested the use of cyclopropane, air and oxygen. Horton's<sup>11</sup> work would suggest the possibility of using a four component mixture containing cyclopropane, ethylene and oxygen with either nitrogen, helium or hydrogen being used as a fourth gas. The clinical employment of such mixtures in safe ranges introduces many practical problems which must be solved.

TABLE I.  
TRENDS IN ANÆSTHESIA AT HARTFORD HOSPITAL

Types	1936	1937	1938	1939	1940
Inhalation .....	88.0	70.4	64.8	61.2	58.4
Regional					
Surgeon's .....	11.6	7.7	5.2	5.3	5.9
Anaesthetist's ....	0.0	10.0	11.9	13.0	12.7
Pentothal .....	0.4	11.9	18.1	20.5	23.0
Total .....	100.0	100.0	100.0	100.0	100.0

It is hoped that some type of device will be produced which will indicate to the anaesthetist when non-explosive mixtures are in use. Until such a device is available and until some of the clinical problems associated with the administration of these mixtures are solved, we must consider that these developments are still in their experimental phase.

In a large series, the hazard of explosion may be reduced by judicious choice of agents and

methods of administration. Regional, spinal or intravenous methods may be used where employment of nitrous oxide and oxygen is considered inadequate. During the last five years, at Hartford Hospital, this principle has been applied and the incidence of employment of explosive agents has been influenced as indicated in Table I.

#### SUMMARY

This report outlines essentially the recommended safe practices approved by the National Fire Protection Association at its meeting in Toronto on May 16, 1941. It does not include all stipulations accepted by the Association and it is recognized that research must be undertaken to establish ways and means of further reducing the hazard. At the present moment an effort is being made to raise a fund to support projects which we hope will lead to the discovery of new safeguards. Sufficient data have been obtained to warrant the statement that if the known safeguards are employed the use of explosive agents is reasonably safe and patients need not be deprived of the advantages associated with their administration.

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## RÉSUMÉ

Les agents anesthésiants hydrocarbonés exposent aux explosions, et il est impérieux de protéger les malades contre de tels risques. Il faut connaître plusieurs critères: dans les endroits exposés (salles d'opérations) l'explosion peut survenir jusqu'à une hauteur de 7 pieds au dessus du plancher; les fenêtres doivent être strictement fermées et l'air doit être renouvelé moins de 12 fois par heure, de préférence par des ouvertures situées près du plancher; le taux d'humidité doit avoisiner 55

pour cent; les circuits électriques doivent être soumis aux standards reconnus; les appareils qui sont en contact avec le malade doivent avoir un voltage inférieur à 6; les lampes fixes doivent être approuvées par le "National Electrical Code"; le plancher doit être très conducteur du courant et être relié au sol; des souliers spéciaux doivent être adoptés pour toutes les salles d'opérations; toutes les autres protections contre l'accumulation d'électricité statique doivent être observées. Ces dangers tendent à populariser l'anesthésie locale et l'anesthésie par voie veineuse.

JEAN SAUCIER

## CARCINOMA OF THE COLON AND RECTUM\*

BY GAVIN MILLER†

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TWO important considerations stand out in any review of the present status of carcinoma of the colon and rectum. The first involves early diagnosis; the second, adequate removal of the growth with low mortality. The responsibility of obtaining the best results possible rests on the patient, the physician and the surgeon. Let us consider first the question of early diagnosis.

Tumours of the rectum and of the colon are usually slow-growing and extend into the adjacent lymph glands or the liver, via the blood stream, late in their development. Miles has stated that eighteen months usually elapses before a cancer grows completely around the bowel. Yet in 100 cases of colonic cancer entering the Royal Victoria Hospital, recently reviewed, 40 were admitted with intestinal obstruction and 70 had extension of the growth to lymph glands, adjacent peritoneum or to the liver. In other words, 70 per cent were admitted to surgery too late to hope for a five year cure.

Lahey has recently reported that 45 per cent of his patients with carcinoma of the colon and rectum are alive and well without recurrence five years after operation. His mortality is approximately 10 per cent. Three years ago the operability of his cases was 54 per cent; during 1938 the operability increased to 88 per cent. He states that the increase in operability was due to two factors: education of the medical and lay public, and operating even in the presence of metastases. Judging from the cases reviewed at the Royal Victoria Hospital, it is my opinion that much work still remains

to be done in educating the lay and medical public, certainly in Montreal and its environments.

It is every surgeon's experience that better results are obtained in private practice than in clinic cases because the patients come in earlier and are in a better state of natural health. This is partly a matter of education but is also one of finance. The working man, supporting a family, has little time or inclination to bother about vague symptoms of no obvious importance. The same applies to his wife struggling to bring up a family without outside domestic help—and there lies disaster.

Let us for a few moments consider how a cancer of the colon or rectum starts and what symptoms may be expected in the initial stages. Because of some, at present unknown, stimulus, the epithelial cells in a small localized area undergo hypertrophy which later progresses into hyperplasia. At this point examination would reveal a small, raised growth, perhaps a millimetre or so in diameter. With this hyperplasia comes a crowding together of cells, with a gradual change in their staining characteristics, until finally they break through the underlying basement membranes and a true cancer is formed. The undisciplined, uncontrolled, embryonic type cells, freed from all restraint, progressively divide and re-divide until the growing tumour outstrips its blood supply, leading to ulceration and necrosis, which allows bleeding, infection with toxic absorption and finally cachexia. As it grows, it also interferes with the normal function of the organ in which it lies, or, by pressure on adjacent tissue, such as nerve roots, causes various symptoms.

Thus it is obvious that, in its early stages, cancer is a symptomless disease. If we keep this

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picture of the early development of malignant growth clearly before us, with its gradual, insidious onset, and the complete absence of symptoms until quite a late stage is reached, with the early symptoms almost unnoticed, we will have gone a long way in solving the problem of early diagnosis.

If in patients, especially those over forty who have noticed the onset of the slightest symptoms, we will immediately suspect carcinoma and make every effort to rule it out before sending them on their way, reassured, with a prescription for useless medicine; early diagnosis will be more frequent. In such cases, the slightest uneasiness in the left lower quadrant, a slight crampy pain, a new tendency to constipation, the feeling that more gas is present or perhaps held up for a moment before being helped on by a cramp, (particularly if any dark blood has been noticed in the stool), should be considered as carcinoma of the bowel until proved otherwise.

Such insignificant symptoms, suggesting a change of bowel habit, call for thorough investigation, including a rectal examination, sigmoidoscopic examination, x-ray of the bowel, and examination of the stool for gross or occult blood.

Another point which is not always fully appreciated, is that every benign sessile adenoma, and, indeed every true polyp is potentially malignant. Biopsy does not prove that a large, sessile polyp is benign, for the growing periphery may remain benign after the centre has undergone malignant degeneration, and the biopsy material in these cases is nearly always taken from the periphery.

If then cancer in its early stages, when it can be completely eradicated surgically, is a symptomless disease, and the symptoms, when they finally arise, do so in a most mild and insidious way, how great is the danger both of patient and physician overlooking the dread possibility of the presence of cancer. If the patient waits, and the doctor waits, until the classic signs of bowel or rectal cancer appear, *i.e.*, bleeding, pain, obstruction, cachexia, alternating diarrhoea and constipation palpable tumour, or ribbon-like stools, they will wait too long and 50 per cent of the growths will have extended beyond their original site, and cure will be impossible.

When it is remembered that almost 70 per cent of these growths are within reach of the

proctoscope, and that most of these growths are symptomless for months, it makes one wonder if every physical examination in every patient over forty should not include a proctoscopic examination. Further, it demands that every physician should own and know how to use a proctoscope. With very little instruction and practice, and usually, with no preliminary preparation of the patient, this examination can be carried out in any doctor's office in ten minutes. Let us not forget that in 1934, according to the U.S. Bureau of Census, nearly 21,000 deaths occurred in the U.S.A. from cancer of the bowel alone. I cannot help wondering how many doctors do a routine rectal examination on every patient they examine, and how many own a proctoscope. The early diagnosis of cancer of the rectum and sigmoid is within our reach, but about 30 per cent of bowel tumours are beyond the reach of the proctoscope, and, to diagnose these in the early stage, we must depend on correct interpretation of the vaguest abdominal symptoms and the x-ray of the large bowel by barium enema. X-ray examination must be urged on the slightest suspicion, and frequently repeated until the cause of the symptoms is definitely known. The true lateral x-ray of the barium-filled colon will show posterior-wall filling defects otherwise apt to be missed. Air-contrast enemata are of great value in aiding diagnosis in difficult cases.

It is well known that carcinoma of the caecum, like that of the stomach, frequently causes marked secondary anaemia before the patient is conscious of any other symptoms. How unusual is the acceptance of the corollary that in secondary anaemia of unknown origin, carcinoma of the caecum must be ruled out though no symptoms are present.

The following two cases will perhaps illustrate some of the points I have stressed.

#### CASE 1

The first patient was sent to me with a diagnosis of internal hæmorrhoids. She had hæmorrhoids, but stated that the blood was frequently dark-coloured. Proctoscopic examination and barium enema were negative, so a hæmorrhoidectomy was performed to see if this would stop the bleeding. The patient was recalled two months after the operation and stated that occasionally she saw a small clot of dark blood. Proctoscopic examination was again negative, except that a small clot of dark blood was seen in the rectum. X-rays were twice negative. Exploratory laparotomy showed a plaque-like cancer of the sigmoid. The patient is alive and well today.

## CASE 2

The second case was referred to me with a diagnosis of profound anaemia and a constricting lesion of the ascending colon. It is interesting to note that in 1937 the patient had presented himself at the hospital with complaints of prostatism, constipation, and anaemia. His hgb. was 64 per cent. At that time, prostatectomy was performed and a barium enema done, which showed a normal colon. His anaemia was treated unsuccessfully. He returned in 1939 with recurrent urinary symptoms and his hgb. was 59 per cent. A barium enema was again done and was reported as showing normal colon. His anaemia was again treated unsuccessfully.

In 1941, he reappeared at this hospital complaining of anaemia for 4 years, diarrhoea and melæna for 1 year, and colicky abdominal pain with weakness for about 2 years. His anaemia was still present with a hæmoglobin of 49 per cent. At this time a barium enema showed an annular carcinoma with constriction of the ascending colon.

He was transferred to surgery where an exploratory laparotomy showed a constricting carcinoma of the ascending colon. A hemicolectomy was successfully performed and at present the patient's convalescence has been excellent. His hgb. was 76 per cent, ten days after operation.

In opening this paper I mentioned two important considerations on which end-results depend, first, early diagnosis which has been, perhaps too briefly reviewed; second, the adequate removal of the growth, with a low mortality, which I now wish to take up.

Perhaps the first point which faces the physician when he has made a diagnosis of cancer of the rectum or colon, is the choice of surgeon and hospital. Has every practising general surgeon sufficient skill to carry out these particularly difficult operations? We have only to review the published mortality figures from various hospitals and clinics to find a range of from 3 to over 50 per cent. In few fields of surgery is an exact appreciation of the hazards and technical difficulties of greater importance in saving life. Lockhart-Mummery reported in 100 cases of perineal resection a mortality of 3 per cent.

Previously, in large bowel anastomosis greater stress was laid by surgeons on the inadequate blood supply than on infection, to explain the leaks which so often caused death from peritonitis. Today, I think it is generally accepted that infection is the greatest single cause of mortality. Cheever reported a reduction in mortality from 24 to 8.5 per cent in resection of the colon when preliminary drainage was instituted. Lockhart-Mummery, for many years, has advocated blind cæcostomy as a preliminary procedure in all cases of large bowel obstruction. This procedure lessens the danger of tension and rupture of the suture line of the anastomosis, should distension occur. Devine has carried this procedure an important step forward by advocating a preliminary de-functioning colostomy

before resecting the left colon. It is well known that when a loop of bowel is diverted from the faecal stream, it tends to sterilize itself. This sterilization can be hastened by frequent washings with some non-irritating antiseptic for a few weeks. This is specially necessary where faeces have collected behind a partially obstructing carcinoma.

In over 200 anastomoses of the jejunum to the stomach in cases of peptic ulcer, I have never lost a patient from leakage of the stoma simply because infection here plays only an insignificant rôle. The same would be true in resection of the large bowel, I am sure, were conditions so arranged that in this site also infection would play an insignificant part.

Such an ideal situation can now be obtained by three important steps. First, attempts must be made to lessen infection by chemo-therapy. Second, the bowel should be sterilized by a Devine de-functioning colostomy; and, third, a very simple method of aseptic anastomosis should be used which I will later describe.

Of course, in addition to these advancements in surgical technique, the usual pre-operative preparations, such as transfusions, high vitamin diet and adequate fluids, must be administered.

In regard to chemotherapy it is advisable to give sulfaguanidine a few days before operation to lessen the virulence of the colonic bacteria. I have not yet had sufficient experience of this to speak with authority. It has been our custom, however, for some time, to give sulfonamides, usually; recently, sulfathiazole, for a few days, post-operatively. Where intravenous glucose-saline is administered, two ampoules of soludagenan had been added to each intravenous injection.

In regard to the operative technique employed for tumours of the left colon, I have attempted the following procedures: (1) A single-stage resection with aseptic anastomosis and a cæcostomy, or, (2) A preliminary Devine de-functioning colostomy, with resection and aseptic anastomosis, carried out three weeks later. For tumours of the right side of the colon, I have carried out a one-stage hemicolectomy with end-to-side anastomosis of the ileum into the side of the transverse colon. For tumours of the rectum, I have performed a one-stage abdomino-perineal resection, if the growth lies below the peritoneal reflection. For growths at, or above, this reflection, I do an end-to-end anastomosis three weeks after a

preliminary Devine colostomy has been carried out. In the three weeks between operations, frequent daily irrigations of the non-functioning loop of colon are carried out. The use of these methods will reduce the mortality to about 10 per cent or lower.

In performing Devine's de-functioning colostomy, a right paramedian incision is made and the transverse colon freed and brought through the wound. If this cannot be sufficiently freed to bring it out without tension, the hepatic flexure is freed and brought out through the wound. A long spur (3 to 4 inches) is formed by suturing the loops of bowel together and

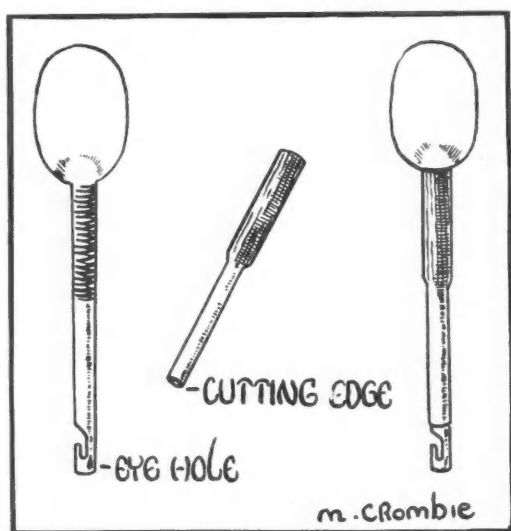


Fig. 1

the bowel is divided. The two ends are drawn through two stab wounds on either side of the incision and the incision closed. The excluded distal colon is now washed out both from the abdominal fistula and from the rectum. A non-irritating antiseptic helps to sterilize the bowel. For this I have used 1/2,500 metaphen solution. These washings are carried out for three weeks, several times a day.

The method of aseptic anastomosis which I have found most satisfactory entails the use of two special needles devised originally, I believe, by Dr. Webster, now of the Presbyterian Hospital, in New York. These needles consist of an inner core containing an eye-hole, and an outer core with a cutting edge which can be screwed down, to cut a ligature passing through the eye-hole of the inner core.

A left transrectus incision is made and the tumour mass freed and brought into the wound. The points on the bowel at which resection is to be carried out having been chosen, the bowel

is freed from its mesentery, and strong linen sutures which have previously been passed through the eye-holes of the special needles are firmly tied about the bowel above and below the growth. On the growth side of these ligatures crushing clamps are placed on the bowel and the tumour removed with the cautery. The bowel extending beyond the ligature is carefully sterilized with the cautery. The ends are brought together and anastomosed, using interrupted fine catgut sutures on fused needles. Great care is taken that the needles do not enter the lumen of the bowel as this may infect the anastomosis. When the first layer of sutures is completed around the anastomosis, a purse-string suture is placed about the special needles. The outer cores of the Webster needles are now screwed down until the ligatures occluding the stumps are cut, thus re-establishing the lumen of the bowel. The purse-string suture is tightened, and the needles are withdrawn. A second layer of interrupted sutures is now inserted and adjacent fat or omentum loosely sutured about the anastomosis as a further precaution against leakage and general peritonitis. The opening in the mesentery is closed, as is the posterior peritoneal bare area and the abdominal wound is then closed with or without drainage. Later, the spur of the de-functioning colostomy is crushed, and three months after an opening is obtained between the two loops the colostomy is closed.

In this manner we have the means of overcoming the great hazard of all large bowel surgery, sepsis, and, with the overcoming of infection, mortality falls to a very low level. It is my firm belief that the next few years will see the mortality of large bowel resections fall generally to approximately 5 per cent. This is an unbelievable improvement, when one remembers that a decade ago mortality figures of 50 even to 70 per cent were the rule.

In closing may I urge greater diligence in routine examinations so that early cancers will come to operation more frequently, that the public be educated so that the onset of the vaguest bowel symptoms will be viewed with suspicion and, that surgeons, attempting resections of the bowel and rectum, will earnestly acquire a meticulous technique and a great appreciation of the danger of infection and the rather simple methods recently devised for its control.

## RÉSUMÉ

La question du diagnostic précoce est de première importance. Le diagnostic sera d'autant plus précoce que l'éducation du public aura été mieux faite. Les signes les plus minimes au niveau de la fosse iliaque gauche—constipation, douleur—avec ou sans présence de sang dans les selles doivent faire immédiatement soupçonner le cancer et motivent la mise en œuvre de toutes les épreuves diagnostiques. Il faut se méfier des polypes sessiles et les biopsier profondément. Comme 70 pour cent des cancers du gros intestin sont visibles au rectoscope, il faut utiliser cet instrument toutes les fois qu'un doute existe. La seule anémie inexpliquée doit faire songer au cancer du côlon. Les radios doivent être précoces et, au besoin, renouvelées.

Lorsque l'opération est décidée il faut préparer le malade en lui donnant pendant quelques jours de la sulfaguanidine, et de la sulfapyridine ou du sulfathiazole après l'opération. L'anus artificiel préalable diminue la mortalité en permettant l'asepsie du côlon exclus. Pour les tumeurs du cæcum et du côté droit l'anastomose peut se faire d'emblée. Les tumeurs basses du rectum sont opérées aussi d'emblée par voie périnéale. Les autres bénéficient de l'anus artificiel pendant les 3 semaines qui précèdent la résection et l'anastomose. La technique de l'anastomose est décrite en détail. En suivant cette ligne de conduite on verra d'ici peu, grâce à prévention de la septicémie, la mortalité de telles opérations tomber à 5 pour cent alors qu'il y a 10 ans elle était encore de 70 pour cent.

JEAN SAUCIER

## SOME NOTES ON PURULENT PERICARDITIS

BY T. E. BROWN

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**PURULENT** pericarditis as secondary to some other infective condition is of sufficiently common occurrence to warrant constant watchfulness for it. The diagnosis is not made easier by the fact that the primary disease is usually severe in its manifestations, and with attention focussed on this, the complication is frequently overlooked. In reviewing some of the literature one is forcibly struck by the reiteration of the writers that the condition is often not diagnosed in life and when the diagnosis is made, too frequently the case is regarded as hopeless.

The experience of the writer is limited to the one case herein reported but during the course of this, a considerable amount of literature was consulted on the subject, and an endeavour has been made to summarize some of the present opinions on purulent pericarditis and its treatment.

The condition may result directly from wounds of the heart. It is frequently seen in sepsis. It may be associated with empyema or it may be a complication of pneumonia. Sub-diaphragmatic abscesses may extend or rupture into the pericardium.

The diagnosis is difficult to make because the symptoms of purulent pericarditis are so often obscured by the primary or antecedent disease. This is particularly so if the original disease is in the chest. Therefore, it is most important to examine the cardiac area frequently, not only with the stethoscope but by percussion, to determine if the area of cardiac dullness is increased. Dyspnoea and præcordial pain are frequently present together and the

pain may draw attention to the heart, but pain is an inconstant symptom. A pericardial friction rub probably is present always at the onset, but disappears as the fluid accumulates. However, this is not a criterion of whether there is or is not fluid present. It does indicate positively pericardial involvement. As the fluid increases the cardiac impulse tends to disappear and the area of pericardial dullness increases. The pericardial sac is relatively inelastic and the rapid accumulation of fluid within gives rise frequently to cardiac tamponade, characterized by a distension of the veins of the neck, pallid cyanosis, low systolic blood pressure, low pulse pressure and distant heart sounds. The pulse is usually rapid and weak and it may be paradoxical. Roentgenograms and fluoroscopic examinations may give valuable information.

Most writers are of the opinion that if a reasonably certain diagnosis can be made without doing a paracentesis of the pericardial sac, so much the better. If a paracentesis is undertaken there is some difference of opinion as to the route by which it should be carried out. The main points are to avoid penetrating the pleura and lung, to avoid injury to the internal mammary vessels and avoid injury to the heart itself. The heart is generally close to the pericardium in front in pericardial effusion, and this should be borne in mind when doing a paracentesis through the so-called "bare area". The best method is to pass the needle upwards and posteriorly at an angle of forty-five degrees, to the left of the xiphisternum. It can be felt to pass through the floor of the

pericardial sac where the fluid is most apt to be obtained. A large or small amount of fluid may be obtained but its nature can be learned, and if it be purulent drainage should be instituted with as little delay as possible.

Phillip Leitner<sup>6</sup> reports a case of suppurative pericarditis, pneumococcal, treated with optochine by repeated pericardial punctures, and cured. The consensus, however, is that operation is the only method which gives reasonable prospect of the patient recovering. The earlier the diagnosis is made and this treatment carried out, the more rapidly will the patient recover. So, if the diagnosis of purulent pericarditis is made, even though the case seems hopeless, operation should be undertaken. It is astonishing how relief of the pressure in the pericardial sac will sometimes give rapid relief and improvement in the patient's whole condition.

There are various ways of approaching the pericardium for drainage. Most operators have laid emphasis on the approach through the "triangle of safety". In endeavouring to go through this they have gone through the chest wall either to the right or left of the sternum, through the sternum, or used a chondro-xiphoid approach. All these approaches are anterior and not the most suitable for drainage, particularly as the accumulation of fluid is posterior to and below the heart. Posterior drainage would be extremely difficult and dangerous. Opening the pericardium from below, the epigastric subdiaphragmatic approach, originally worked out by Ogle and Allingham, is probably the best. The approach by resecting portions of the fourth and fifth or more cartilages, to the left of the sternum through the triangle of safety, with or without resecting a portion of the margin of the sternum, would seem to be the more easily and rapidly accomplished.

Some operators have not used drains; most use one or two. Closed drainage appears to have no place in these cases. Again there appears to be considerable difference of opinion as to where these drains should be placed, whether at the opening in the pericardium, just within the pericardium, or carried around posterior to the heart. I. A. Bigger<sup>1</sup> does not use drains, but sutures the pericardium to the muscle or fascia. Arthur Shipley and Nathan Winslow<sup>3</sup> report an analysis of 99 cases. "More than half the operators showed a preference for

tube drainage. Usually two tubes were employed in which case one was placed in the cul-de-sac on each side of the heart. Next in popularity came rubber tissue. . . . On the whole there is not much choice between the methods practised. All are attended by about the same percentage of recoveries."

Whether irrigation of the pericardial sac is advantageous or not is a question. "If the patient is doing well leave him alone." Normal saline and boracic solutions are the most frequently used. If irrigations are carried out two tubes should be inserted into the pericardium in order that the solution may return freely.

Changing the position to improve drainage is not always possible in the very ill patient, but if it can be accomplished is an advantage. Local anaesthesia with novocaine is the best for these cases and in the literature reviewed this agent was the anaesthetic of choice. The usual position for operating was with the patient semi-sitting.

#### CASE REPORT

The patient, a boy, aged three and a half years, rather small for his age, was first seen at his home February 18, 1940. The diagnosis was acute tonsillitis. On February 20th, he had signs of consolidation in the right lung and was removed to the Galt Hospital. At this time the heart sounds were healthy.

For the first three days there was apparent improvement in the patient's condition. The temperature dropped from 103°, February 21st, to 98.2° February 23rd at 4 p.m. The pulse rate which on admission was 164 went down to 110 and the respirations from 48 to 30. The temperature, pulse rate and respirations, then went up again. They varied from, temperature 98.4 to 102°; pulse rate 120 to 160; and respiratory rate sometimes over 60. On February 29th many fine râles with bronchial breathing were heard in the left chest posteriorly near the lower angle of the scapula. X-ray indicated a large pericardial effusion (Fig. 1). March 1st, a needle was inserted, after injecting novocaine, into the pericardium through the fourth interspace about half an inch from the sternum. A small amount of thick pus was obtained. This contained pneumococci. March 2nd the child's condition was very poor and decision was made to drain the pericardium.

Novocaine, 1 per cent, with four drops of adrenaline 1:1,000 to the ounce was used for a local anaesthetic. With the child in a semi-sitting position, after preparation of the skin, an incision about three inches long was made to the left of the sternum. Portions of cartilages of the 5th and 6th ribs were resected. The internal mammary vessels were tied off. I placed two stay sutures in the pericardium and opened between them. About one pint of flocculent yellow pus escaped. A small Penrose drain was sutured just within the pericardium at the lower extremity of the wound.

The child's condition improved almost at once following evacuation of the pus. He breathed more easily and the pale cyanosis was less marked.

On March 6th the condition was noted as improving since the operation. The temperature, pulse rate and respirations were still markedly elevated, however. That afternoon the nurse in charge of the case phoned to say that the Penrose drain had come out and she had replaced it. "Now it was not to be seen." March 7th,

as the drain had not been found I was forced to the conclusion that it was within the pericardial sac. On March 5th an x-ray had been taken of the chest (Fig. 2). This indicated that drainage of the pericardial sac was not satisfactory. The child's condition also was retrogressing. For these obvious reasons it was decided to find the drain and lengthen the incision downwards.

Before the first operation no medication was given. This time a quarter grain of codeine was administered hypodermically and three-quarter grains of luminal given by mouth. A novocaine local anæsthetic was again used. The 7th cartilage was resected close to the sternum, the finger was inserted into the sac and the drain finally located posteriorly, in the cul-de-sac to the right of the heart. This was secured with curved artery forceps and removed. There was a large amount of purulent fluid in

On April 14th, the child weighed 23 pounds 13 ounces; on April 20th, 25 pounds 11¼ ounces. When he was discharged from the hospital his weight was 25 pounds 4½ ounces, the temperature was 98.2, pulse rate 112, and respirations 38. The wound still discharged yellowish pus. There was considerable deformity of the anterior chest wall.

Last autumn the child had whooping-cough with no untoward results. He had acute tonsillitis last winter and again in August of this

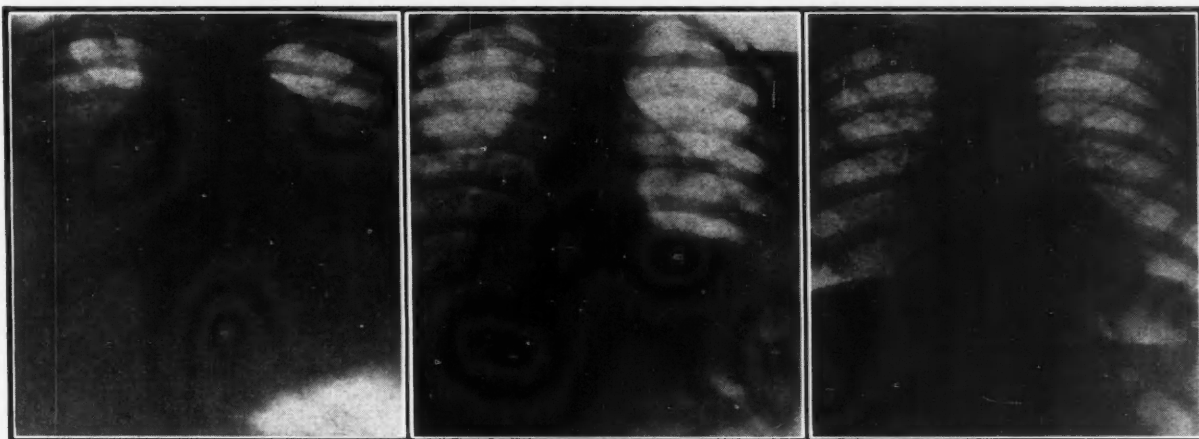


Fig. 1

Fig. 2

Fig. 3

Fig. 1.—The heart shadow is tremendously increased and has the pyramidal effect seen in pericarditis. Fig. 2.—The pericardial sac is still widely distended. There is air in its upper half and a fluid level at about the auricle-ventricular junction on the left side. The apex and diaphragmatic areas are still dense. Fig. 3.—Heart shadow is normal in size for a child of his age. The outlines of the heart shadow are irregular and are suggestive of thickening of the pericardial sac. There is no marked appearance of pericardial constriction or is the pericardium fixed to the diaphragm abnormally.

the sac but no walling off or adhesions could be felt. This time a Pezzer catheter with the bulbous portion cut away to leave only a flange to hold its end within the sac was used for a drain. The muscles and fascia were drawn together with a couple of interrupted cat-gut sutures and interrupted silk-worm gut used in the skin.

Following this operation, attempts were made to remove the pus from the pericardial sac twice daily by aspirating with a syringe through the modified Pezzer catheter. Several times, on different days, a small catheter was inserted close to the drain and attempts made to irrigate the pericardial sac. Both boracic and normal saline solutions were used. The aspirations were continued until March 20th.

On the day previous to the first operation we gave the patient 100 c.c. of blood and 100 c.c. the day after. On March 28th 100 c.c. of blood were given and this was repeated on March 30th.

The child was given dagenan, 3¾ grains every four hours almost continuously from February 27th to March 15th. Until March 19th the same amount was given every six hours and then it was discontinued.

The drain was removed April 5th, about twenty-five days after operation. There was a small amount of sero-purulent discharge. The temperature was 100.6°; pulse rate 126 to 134; and respirations 38 to 40.

year. The first part of this month October, 1941, under a general anæsthetic, the tonsils were removed. The recovery was uneventful.

At the present time the child is apparently healthy. He is quite lively; plays and runs as other children of his age do. He is well nourished, his colour is good, and he has no respiratory distress or discomfort. The heart sounds are normal. The deformity of the chest is becoming much less marked. Fig. 3 shows the condition of the pericardium on January 24, 1941.

The writer wishes to acknowledge advice and assistance from Doctors P. M. Campbell, W. E. Bryans, M. J. Tuttle, E. Cairns, and S. M. Rose.

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## COMPLETE HETEROTAXIA ASSOCIATED WITH OBSTRUCTIVE JAUNDICE

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FROM the standpoint of differential diagnosis the knowledge of the presence of heterotaxia is extremely important. Differentiation between congenital dextrocardia and displacement of the heart to the right due to chest disease, or palpable pathological masses in the left upper abdominal quadrant from a left-sided liver are examples in point. That heterotaxia may be present should always be kept in mind by the clinician, regardless of the fact that its existence in no way impairs the activity of the patient or affects his life span.

The term complete heterotaxia implies a true *situs transversus viscerum totalis*, not simply the location of organs on the opposite side of the thoracic or abdominal cavity. The organs are so situated that if a mirror were placed before them the reflection would appear as an accepted normal. The transposition may be complete, or it may involve only the heart, heart and great vessels, or abdominal viscera. In reviewing the literature on the subject one observes that total transposition is more common. However, this by no means suggests that the condition is more than an anatomical rarity. Using Feldman's<sup>1</sup> Tables 137 and 138, it was noteworthy that of the total 844,150 cases examined only 63 showed transposition of the abdominal viscera. By the more frequent and judicious use of x-ray studies the incidence of observed visceral transposition should rise.

Excellent summaries of historical interest on the subject have been given by Grüber,<sup>2</sup> Arneill,<sup>3</sup> and Karashima.<sup>4</sup> It is not within the province of this presentation to reiterate these summaries.

I have been able to collect fifteen more recently reported cases of complete visceral transposition, to which the case herein presented is an addition. Williams,<sup>5</sup> in 1922, remarked on "the paucity of reported cases from x-ray examination alone" and noted that

of reported cases this anomaly was mostly found at time of operation or autopsy. However, practically all of the recently reported cases were diagnosed on roentgenological study and/or physical examination.

Associated congenital malformations are not infrequently found. Tecce<sup>6</sup> reported his case as having triorchidism. Matusoff's<sup>7</sup> patient and de Capite's<sup>8</sup> two cases had congenital cardiac malformations. Larson<sup>9</sup> stated that his case of heterotaxia had an associated hare-lip, large patent foramen ovale, and congenital achondroplastic dwarfism.

### ETIOLOGY

Most authors concede that complete heterotaxia occurs predominantly in the male. In this series of 16 unselected case reports, however, the sex distribution was eight males and eight females. Grüber<sup>2</sup> in 1865, while reporting on 79 cases of transposition, noted 49 were in males, and 19 in females; he failed to specify the sex of the remaining 11.

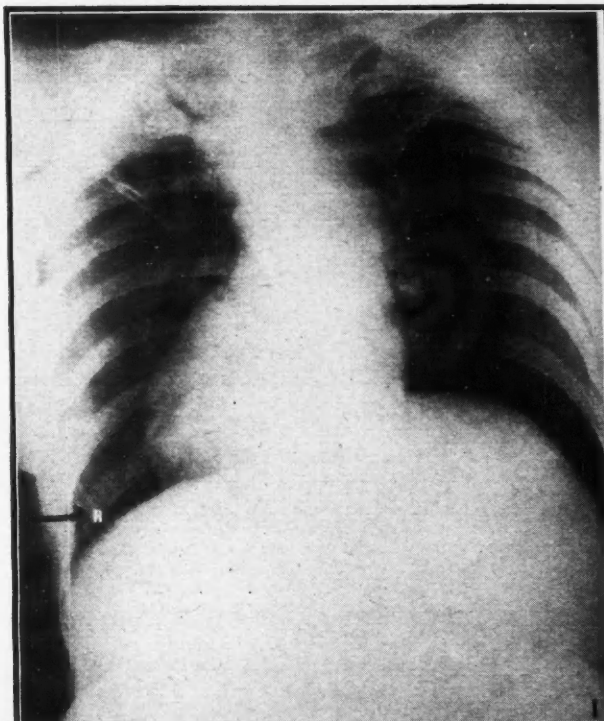
Author	Year reported	Male	Female
Hartz <sup>10</sup> .....	1916	2	
Williams <sup>5</sup> .....	1921	1	1
Sherk <sup>11</sup> .....	1922		1
de Capite <sup>8</sup> .....	1924	1	1
Pezzi and Carugati <sup>12</sup> ....	1924	2 (twins)	
Matusoff <sup>7</sup> .....	1930		1
Tecce <sup>6</sup> .....	1931	1	
Rush and Rush <sup>13</sup> .....	1932		1
Middleton <sup>14</sup> .....	1937		1
Reddy <sup>15</sup> .....	1938	1	
Larson <sup>9</sup> .....	1938		1
Rossie (herein reported).	1941		1
Total .....		8	8

Boeminghaus, according to Feldman,<sup>1</sup> "believes that in 50 per cent of twins one will probably show a *situs inversus*". Pezzi and Carugati<sup>12</sup> found in their twin case that both brothers had total *situs viscerum transposus*.

Many theories as to the cause of this anomaly have been advanced but none seems to merit being accepted as conclusive. Adami<sup>16</sup> believed that a possible explanation might be the diversion of the main blood currents to and from the germinal area at an early stage of development. Hence, the blood vessels of one side

would receive more blood, with the result that that side of the organism would better develop.

Pezzi and Carugati<sup>12</sup> conclude that cardio-visceral transposition seems to result because of an abnormal relationship between the embryo and the umbilical vesicle. This situation consequently causes an inversion of the om-



**Fig. 1.**—Heart directed to the right. Left half of diaphragm is higher than the right due to transposition of the liver.

**Fig. 3.**—Transposition of the terminal ileum, caecum, colon, and sigmoid.

**Fig. 2.**—Transposition of the stomach and small intestines.

**Fig. 4.**—Mass seen just below the left costal margin as a result of liver and gall-bladder transposition.

phalomesenteric veins, which in turn results in an inversion of the viscera.

Sherk<sup>11</sup> refers to Virchow's observation that normally the umbilical cord is spirally wound to the left and in heterotaxia to the right. Whether or not this plays any part in the etiology is still among the mysteries of medical problems.

### CASE REPORT

This patient was unaware of the existing mirror transposition of the viscera. Inquiry was made from her family physician as to whether or not the anomaly was previously noted and whether this case was reported in the literature. The answer was "no" to both questions.

T.K.S., female, aged 78 years, March 15, 1939.

**Chief complaints.**—Belching and epigastric fullness immediately after meals for many years. Recently epigastric distress occurring at night became very annoying.

**Personal history.**—She never had had any of the usual childhood diseases. Had had typhoid fever and pneumonia during adult life. Her right tibia was fractured in 1909. No operations.

**Family history.**—Of no special importance.

**Symptomatology.**—No symptoms of the eyes, ears, nose, throat, nor gums. The teeth had been extracted because of previous pyorrhea. No cardiac or respiratory symptoms. Besides nocturia for many years there were no urinary symptoms. Gravidity V; Para IV; miscarriage I. Somewhat nervous, but no other symptoms of the nervous system.

Her appetite was fair. There is no difficulty on deglutition, nausea, vomiting, or true hunger-pain. Belching and heart-burn occur about one-half hour after meals. For the past seven years the patient had been awakened by moderately severe cramp-like pain in the left upper abdominal quadrant. This pain radiated to the epigastrium and was relieved by food, alkali, or bowel movement. Fried foods or raw fruit seem to disagree and bring on the pain six to eight hours after meals. Following pregnancy fifty years previously the patient was jaundiced for "a short period of time". She was never jaundiced subsequent to this attack. The bowels "never" moved without an enema or laxative. The stools were usually hard, greenish-brown, and in small pieces. There was no pain on defecation. She had lost about fifteen pounds in the past six months.

**Habits.**—She was a moderate user of tea and coffee, but never used alcoholic beverages. She averaged eight hours' sleep per night.

**Physical examination.**—Weight 125 lbs.; hgb. 78 per cent (Dare); blood pressure 175/115; temperature 98° F.; pulse, 88 regular and somewhat bounding. Eyes, ears, nose, throat, and gums presented nothing remarkable. There were no palpable lymph glands.

Chest: the lungs presented nothing unusual. The maximal apex beat of the heart was to the right of the mid-line. There was an apical systolic bruit,  $A_2 > P_2$  with the  $A_2$  to the right and  $P_2$  towards the mid-line. On fluoroscopic examination the suspected dextrocardia was noted.

Abdomen: there was tenderness over the left upper quadrant just beneath the costal margin; otherwise nothing remarkable.

**Impression.**—(1) Hypertension with hypertensive heart disease. (2) Dextrocardia. (3) Chronic cholecystitis with lithiasis. (4) Complete heterotaxia.

Roentgenological study revealed a complete mirror transposition of the viscera. The cholecystographic

study revealed delayed emptying but no visualized calculi.

Surgical intervention was not suggested because of the patient's age and response to medical treatment until August 6, 1941. On that date she was seized with an attack of chills, fever, sweats, nausea, vomiting, and severe pain in the left upper abdominal quadrant. The pain radiated to beneath the left scapula. On examination: blood pressure 185/100; temperature 101° F.; pulse 104, regular and bounding. The heart gave evidence of hypertensive heart disease. There was a tender palpable mass in the left upper quadrant. The mass is the size of the average gall-bladder and located in the mid-line just beneath the left costal margin. There is some rigidity over the left upper quadrant. There was slight icterus of the sclerae.

The following day the skin became jaundiced, the temperature rose to 104° F., and the general picture indicated a poor prognosis. The patient was hospitalized. Blood studies confirmed a diagnosis of obstructive jaundice. The patient was properly prepared for surgical intervention but her general condition was too poor for such interference. Exitus took place on August 8, 1941. Autopsy was denied.

### SUMMARY

1. Heterotaxia was known for several centuries to exist. This condition was reported in the literature by several<sup>1, 2, 3</sup> and those whom they quoted.

2. The clinical significance of *situs transversus viscerum totalis* is purely as regards differential diagnosis, since it does not interfere with the life span or physical status of the individual.

3. None of the theories as to the cause of this anomaly seems to merit being accepted as conclusive. I believe that more frequent x-ray studies will show that sex plays no part in visceral mirror transposition.

4. A case complicated by obstructive jaundice is presented.

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## TRANSURETHRAL PROSTATIC RESECTION\*

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THE perfection of instrumental methods for removal of prostatic obstructions has been one of the greatest advances in surgical technique in many years. About twenty years ago Caulk<sup>3</sup> suggested that relatively large amounts of prostate could be removed by instrumental means. Very few men could obtain the same results as he did with an instrument which at that time made the operation a blind procedure. However, about ten years ago new telescopic and direct vision instruments were perfected which made possible visualization of the entire procedure. Since then instrumental operations have increased continuously in popularity and will undoubtedly eventually replace all forms of open operation almost entirely, as more and more surgeons become dextrous in the use of these instruments.

Much has been said and written concerning the present status of transurethral resection. I would like to repeat what Foley<sup>8</sup> has said, that each of these men in reality describes his own status and skill as an instrumental operator. There is general agreement among most men that instrumental operative methods are preferred for carcinoma and fibrous lesions of the prostate gland. There is considerable disagreement on the other hand, concerning the place of such methods in the treatment of benign prostatic hypertrophy. Those who minimize the value of resection have obtained poor results with the operation, whereas those who praise it have had good results and use it with satisfaction in 98 to 99 per cent of their cases. Later in this paper the reasons for such varied results will be explained.

Enough has been said already concerning the shorter period of hospitalization, the rapid, dry, almost painless convalescence, the lower mortality rate and generally excellent results obtained by those proficient operators who use transurethral resection.

I shall try to describe here a few facts concerning our methods for the management of prostatic obstructions in Calgary and how we

have overcome some of the difficulties which others have had.

A review of some of the fundamental facts concerning the nature and anatomy of prostatic hypertrophy is essential to an understanding of what the disease is, what a prostate operation accomplishes, and why difficulties are encountered, particularly with instrumental methods. The cause of these difficulties and a way to avoid them will be described. To substantiate these opinions, a review of our experience at the Calgary Associate Clinic will be made.

Deming<sup>5</sup> has shown very clearly the nature of prostatic hypertrophy. It begins as a fibromuscular nodule near the urethra, which is invaded later by glandular tissue from adjacent prostatic ducts, thereby forming an adenoma-like nodule. There may be several such nodules forming simultaneously. Later they may

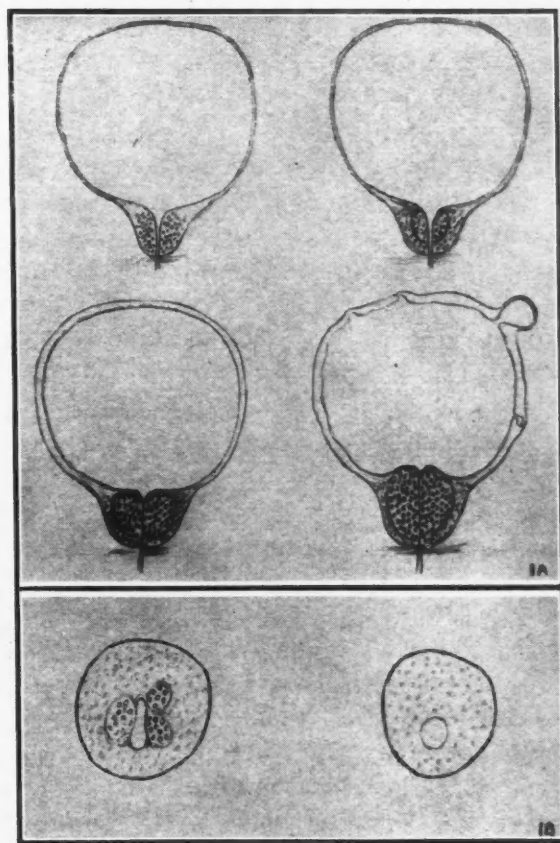


Fig. 1A.—Diagram showing how nodules of hyperplastic tissue develop centrally in the prostate near the urethra and compress the true anatomical prostate to form a surgical or false capsule. Fig. 1B.—The same thing illustrated in cross section.

\* From a paper presented before the Section of Urology at the Seventy-second Annual Meeting of the Canadian Medical Association, Winnipeg, June 26, 1941.

coalesce or may remain discrete. They develop along lines of least resistance and this together with their original location determines the future shape of the enlarged prostate. I like to illustrate this process diagrammatically in the manner shown in Fig. 1. This clearly demonstrates the fact that the disease which we call hypertrophy of the prostate is not in fact a true hypertrophy of the anatomical prostate gland but that it is an adenoma-like hyperplastic process involving structures in the prostate gland immediately adjacent to the urethra. Masses of tissue are produced which compress the true anatomical prostate gland in such a way that it is compressed to form a false or so-called surgical capsule around these centrally growing hyperplastic masses.

Both suprapubic and perineal prostatectomy remove these masses completely, leaving the shell of true anatomical prostate gland which later shrinks back to a condition often approaching normal. Transurethral instrumental methods also can remove these masses of hyperplastic tissue completely. I shall point out later that thorough, complete removal of the hyperplastic tissue is essential in order to obtain good results and to avoid the complications of hæmorrhage and infection.

It is the obstruction to urination which produces the symptoms of prostatism, and the degree of obstruction is not necessarily relative to the size of the gland. Suprapubic and perineal prostatectomy generally remove all of the hyperplastic tissue, thereby thoroughly removing the obstruction. A good result with restoration of bladder function to normal is the natural result. If all the hyperplastic tissue is removed by the instrumental method then the obstruction will likewise be removed and a good result will be obtained always.

Ten or twelve years ago when the first wave of popularity for transurethral methods swept the country we were taught to bore a hole through the prostate, to cut a trough through the centre, or to remove the median lobe which was alleged to be causing the obstruction. More recently we were advised to remove everything seen projecting beyond the verumontanum. Such operations did not remove all of the hyperplastic tissue as was done by prostatectomy. The remaining tissue caused partial obstruction which accounted for persistent symptoms and persistent infection. The result was unsatisfactory to both patient and

doctor and often the remaining tissue had to be removed by suprapubic prostatectomy. A modern properly performed transurethral operation removes the adenomatous tissue completely from the entire circumference of the prostate and from its apex to the bladder, thus leaving the capsule as clean inside as after perineal or suprapubic prostatectomy. Functional results following such an operation are always good because the patient empties his bladder completely with a large urinary stream.

With constant determination to master the technique one can soon learn to tell when all of the adenomatous tissue is removed. The adenomatous tissue with its rough granular surface can be differentiated clearly through the instrument from the annular striated capsule. Tissue must be removed everywhere down to the capsule. In my experience difficulty has been encountered in seeing tissue near or lying behind the sphincter. A finger in the rectum while the instrument remains in the urethra will palpate nodules of remaining tissue against the instrument and locate their position accurately. Then these nodules can be pushed in from the side and more readily visualized and removed. Thus transurethral prostatectomy becomes possible. All the tissue is removed, thereby removing the obstruction. A good urinary stream, complete emptying of the bladder, and a good result follow.

Having shown why thorough removal of hyperplastic tissue is necessary to obtain a good functional result, I shall try to explain why thorough removal of tissue is necessary to avoid hæmorrhage and infection. An understanding of the blood supply to the enlarged prostate is essential. This has been studied and best illustrated by Flocks.<sup>7</sup> He showed that the hypertrophied prostate has two chief groups of arteries supplying it with blood. These are the external capsular group and the internal urethral group. This latter group forms the main source of blood supply. These vessels enter at the prostatic vesical junction and then take a course distally more or less parallel to the urethra. Usually in the early course of the operation these vessels are cut. Bleeding during the latter part of the operation is much less than during the first stages. This is a common experience with which we are all familiar. When these chief supply vessels have been cut, the remaining hyperplastic tissue is relatively avascular. The external capsular group of

vessels penetrates only very slightly and contributes negligible quantities of blood to the hyperplastic tissue. Therefore any hyperplastic tissue which is not removed becomes necrotic. The necrotic tissue becomes infected readily, may slough off producing late secondary hæmorrhage, and heals very slowly and poorly. Infection in it resists treatment and produces pyuria, frequency, and urgency for many months, if not indefinitely. Complete removal of the hyperplastic tissue obviously avoids these difficulties.

Sometimes bleeding during the operation is troublesome. The spurting arteries are difficult to find if they happen to be hidden behind pieces of incompletely removed prostate. When the hyperplastic tissue is removed clean-

TABLE I.  
TRANSURETHRAL RESECTION FOR PROSTATIC OBSTRUCTION

Lesion	First 100 cases	Second 200 cases
	percentage	percentage
Hypertrophy .....	78	81.5
Carcinoma .....	7	9
Fibrous lesions .....	15	9.5
Complications and Results		
Hæmorrhage .....	11	0.5
Died .....	6	4
Unsatisfactory result .....	8	1
Good result .....	86	95

ly and completely down to the capsule, the spurting vessels are seen easily and coagulated. Thus bleeding during the operation is much less and the probability of secondary hæmorrhage and infection is lessened.

Our experience at the Calgary Associate Clinic during the last four years bears out the points I have emphasized. Our first three hundred consecutive cases are divided into two groups, namely the first hundred and the next two hundred. The Table shows the pathological findings and the results obtained with transurethral resection. The deaths are recorded and also those cases in which operative or post-operative hæmorrhage was so great that several transfusions were required. The small proportion of resections for carcinoma is due to the fact that in some instances suprapubic cystostomy was done, whereas in others there was not enough obstruction to require operation.

A good result is one that satisfies both doctor and patient. It means complete emptying of the bladder with either no infection or minimal infection, and bladder function approaching normal. It is obvious from the Table that better results with fewer complications were

obtained in the latter group of cases. I am sure that the hyperplastic tissue was removed more thoroughly as more skill was acquired in the use of the instrument. A very thorough transurethral prostatectomy is now performed in every case. This has been proved at several autopsies, where the capsule has been found almost as well cleaned out as after suprapubic prostatectomy. The thorough operation undoubtedly accounts for the better results, lower mortality rates and lesser incidence of hæmorrhage and infection. As more experience and skill are acquired, better results are to be expected in the future.

#### SUMMARY

The nature of the disease we please to call enlargement or hypertrophy of the prostate gland is described briefly. The blood supply of the prostate is reviewed.

Poor results with transurethral resection and complications of hæmorrhage and infection generally are due to incomplete removal of the hyperplastic tissue, whereas good results with few complications nearly always follow a thorough operation which might be called a transurethral prostatectomy. The reasons for this are given and a method described for determining whether the hyperplastic tissue is completely removed.

The experiences of the Calgary Associate Clinic clearly reveal that thorough removal of all the hyperplastic tissue yields better results and minimizes those complications of infection and hæmorrhage which have tended to discourage the use of instrumental methods in the hands of some men.

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## RÉSUMÉ

La résection transurétrale de la prostate est préférée par ceux qui, maîtrisant bien la technique opératoire, peuvent offrir une statistique que justifie l'excellence du procédé. Ce que l'on appelle hypertrophie de la prostate est en réalité une hyperplasie adénomateuse intéressant la région immédiatement adjacent à l'urètre.

L'exérèse totale est essentielle si l'on veut éviter l'hémorragie et l'infection. Cette exérèse totale peut être parfaitement réalisée par la résection transurétrale.

Les forages d'il y a 10 ans étaient incomplets et les résultats étaient souvent mauvais. Aujourd'hui, on enlève facilement tout le tissu adénomateux et les résultats sont excellents. L'exérèse totale évite notamment l'hémorragie et l'infection subséquente. La technique est relativement simple si l'on en juge par les résultats obtenus après quelque expérience. On obtient actuellement à la Clinique de Calgary 95 pour cent de bons résultats.

JEAN SAUCIER

## ALLERGY TO LIVER EXTRACT

By E. P. SCARLETT AND D. S. MACNAB

*Calgary*

SINCE the introduction of parenteral liver extract in the treatment of pernicious anæmia, reactions have been observed following its injection. These reactions have varied in nature and degree, from a transient urticaria to severe anaphylactic shock, and in nearly every instance such manifestations have been apparently of an allergic nature. While such reactions are rare, it is important to recognize the fact that they do occur and that they may be of an alarming nature.

In a survey of the literature, some 25 cases in all have been reported up to the present time. The first reports from American observers in 1931 described the development of an asthmatic reaction and of urticaria. German and Netherland writers noted erythematous eruptions, urticaria, angioneurotic oedema and asthmatic responses. Murphy<sup>1</sup> in 1933 reported two reactions in 1,000 cases in which liver extract had been used. More recent reports detail mainly skin and pulmonary manifestations, urticaria being the most common. Some of the reported reactions however have been very severe. Andrews<sup>2</sup> describes two anaphylactic reactions occurring in a woman who had received regular treatment with parenteral liver extract for eighteen months. In each attack there were faintness, sweating, diarrhoea and the patient became pulseless. She responded to epinephrine and coramine. Diefenbach and Yuskis<sup>3</sup> describe collapse with thready pulse and urticaria occurring in a woman who had been on interval liver injection treatment over a period of months. Jones<sup>4</sup> reports the case of a man who had received treatment periodically for seven months developing a reaction of a major anaphylactoid nature, with collapse, tachycardia, clammy extremities, frothy sputum and fall in

blood pressure. At least two such severe reactions have been reported in the foreign literature.

The following cases, one mild, the other severe, have been observed in recent months.

## CASE 1

A white woman, aged 62, had experienced mild attacks of asthma as a girl but had otherwise been well and active. In August, 1940, she complained of being tired and was given liver extract (anahæmin 2 c.c.) intramuscularly by a nurse. She received no further injections or medication until October, 1941, when, as she again complained of fatigability, she was given an intramuscular injection of 2 c.c. of the same material. In ten minutes' time she became flushed, developed a generalized urticaria, and the tongue became swollen to the point of acute discomfort. Epinephrine was given and the reaction subsided within two hours.

## CASE 2

A white male, aged 42, an electrician, first seen in March, 1933, complained of weakness, vomiting and difficulty in walking. There was nothing of note in his past history. His father had suffered from asthma all his life. The outstanding findings on examination were a spastic gait, motor weakness in both lower extremities, loss of vibration sense over both shins, a positive Romberg sign and marked increase in the patellar and Achilles reflexes. The hæmoglobin figure (Sahli) was 50 per cent, erythrocytes 1,800,000 per c.mm., colour index 1+; the smears showed a predominance of macrocytes. There was complete absence of hydrochloric acid on gastric analysis. A diagnosis of pernicious anæmia with associated cord changes was made, and treatment with liver extract by mouth and diet was instituted. Clinical improvement was rapid and marked. Within four months the cord symptoms had disappeared and in six months the patient was able to return to work. Early in 1934 intramuscular injections of liver extract were begun. The patient did not always report regularly, but received treatment about once every two months for the next two years. In 1936 the necessity of regular treatment was impressed upon him and in the next five years from 1936 to 1941 he received an injection of liver extract at monthly intervals. From 1936 to 1939 the material used was liver extract—campolon in an amount of 2 c.c. In 1940 the extract was changed to liver extract (Lederle 1 c.c.) at each injection. The blood was maintained at normal levels and the patient was well and worked regularly.

After the intramuscular injection in April, 1941, his wife reported that in about fifteen minutes' time, while on his way home, the patient suddenly became very weak and pale, had difficulty in breathing and

she had been unable to feel his pulse. The attack passed off in about two hours' time. He was not seen by a physician at the time.

On May 9, 1941, he reported at the office. It was thought that the previous attack might have been an intercurrent affair as the patient was of a rather apprehensive type. Accordingly he was given an intramuscular injection of 1 c.c. of liver extract (anahæmin) and remained in the office for observation. In ten minutes' time he developed a severe reaction which was in the nature of a complete collapse; marked pallor, subnormal temperature (96° F.), rapid thready pulse, tachypnoea, clammy perspiration. He was barely conscious. There were no rhonchi throughout the chest and no bladder incontinence. Epinephrine was given immediately and relief was obtained within an hour. Following the reaction he had a severe headache and weakness for several hours.

Two weeks later intradermal tests were carried out. There were marked reactions to liver extract (Lederle) and liver extract (anahæmin) in dilutions of 1:10 and 1:100. Intradermal tests with buffered saline solution were negative. Control tests on a patient under treatment for pernicious anemia with liver extract (anahæmin) were negative.

In order to determine whether the sensitivity was to the liver and its antianæmic fraction or to the biological source of the liver, intradermal tests were made with extracts of muscle protein from pork and beef and from horse serum. These showed uniformly negative reactions.

One month later, that is, six weeks after the initial allergic reaction, these intradermal tests with liver extract were repeated. The patient gave positive skin reactions to liver extract in dilutions up to 1:1,000. The reactions were of marked degree.

Almost six months after the initial attack the intradermal tests were again repeated. It was found that he still gave very marked reactions to both the liver extract (Lederle) and the liver extract (anahæmin) up to 1:1,000 dilution.

Following the initial attack the patient was placed on 20 grams of ventrex daily. Oral liver medication was not instituted, nor was an attempt made at desensitization by using increasing amounts of diluted liver extract. The patient has continued in good health and his blood has been maintained at a normal level.

#### DISCUSSION

In the first case reported a mild reaction to parenteral liver extract occurred in an allergic individual after a second intramuscular injection, the first injection having been given fourteen months previously. In the second case, sensitivity to liver extract was acquired after seven years of parenteral administration. It would seem therefore that some patients, whether naturally allergic or not, may develop an allergic response to injected liver substance at any time during the course of treatment. The length of time which elapsed in the second case before such manifestations occurred is remarkable.

The sensitivity developed under such circumstances is an acquired allergy. Observers have found that it is possible to become sensitized to liver taken as a food, and further that such sensitivity may be specific for that organ without any reaction whatever to the muscle food of the same animal. When the liver is given by injection the sensitivity of course is more

marked. It has also been pointed out that eosinophilia may follow administration of either whole liver or parenteral liver which would appear to indicate an allergic response.

Criep<sup>5</sup> who carried out immunological studies in a case of liver allergy concluded that such acquired allergy is analogous to that occurring with insulin and with posterior pituitary extract. He was able to demonstrate reagins and precipitins but no anaphylactic bodies. The existence of the sensitivity apparently depends on the presence of reagins. He found further, in accordance with Coca's opinion, that such reagins, in contrast to those found in natural allergy, tend to disappear after a period of months, and with them the patient's sensitivity.

The allergic reaction to liver, in some instances at least, is due to sensitivity to an organ and not to a biological source. In the second case reported above, the patient reacted to two commercial brands of liver extract but not to serum or muscle extract from beef, hog, or horse. This would seem to indicate an organ specificity.

While these are some of the characteristics of liver allergy, there are many features which are not explained and in the last analysis the cause of the acquired reaction is not clear. The sensitivity for example cannot be experimentally produced in otherwise allergic individuals. There are factors concerned with the mode of production and with the liver substance responsible for the reactions which are quite obscure.

To continue treatment with the anti-anæmic principle in a liver-sensitive patient, there are several courses which may be followed. Liver concentrate may be given by mouth with little fear of reaction in most cases, according to reports in which this has been tried. Desensitization to parenteral liver extract can be carried out. This was successfully done by Grün,<sup>6</sup> Engel,<sup>7</sup> Krantz<sup>8</sup> and Andrews<sup>2</sup> in their cases. Bynum<sup>9</sup> was able to substitute a special liver extract manufactured by Messrs. Ayerst, McKenna & Harrison, Montreal, which was said to be free from protein and histamine. He found no skin or allergic response to this deaminized product. One may discontinue liver therapy entirely and give ventriculin by mouth in a maintenance dosage of 10 to 20 grams daily. And finally in a number of the reported cases it has been possible gradually to resume the intramuscular liver injections after an interval of six months to a year.

## SUMMARY

1. Two cases of allergy to parenteral liver extract are reported.

2. Reports of previous cases of such allergy are reviewed and the characteristics of the reactions and the basis of their occurrence are discussed.

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## THE ROUTINE TREATMENT OF ACNEFORM ERUPTIONS

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THE treatment of acne as recorded in the literature, does not seem to be entirely satisfactory, although a considerable variety of treatments is described, each of which seems to be of benefit in a certain percentage of cases. It seems, therefore, that a line of treatment which has yielded marked benefit in practically 100 per cent of a score of cases is worthy of description.

The theory on which this method of treating acne is based is that the cause of acne is not single, but multiple in nature, and that therefore, no single treatment is likely to cure all cases. In this, as in so many chronic conditions, nature is ever at work trying to effect a cure, and a little assistance such as is given by removing one of the causes will often result in marked benefit, the various processes of nature being able in time to remove the remaining causes. Thus, in the case of acne, we have lists of cases treated with local applications of various kinds, with improvement in a certain percentage. Other cases, treated by inoculation with anterior-pituitary-like sex hormone, show a considerable percentage of complete cures, but also a fair number of failures. Some workers have also been able to get good results with staphylococcal or mixed vaccines. A considerable number of other lines of treatment, manganese, tin, x-ray, etc., have each their advocates from time to time.

Careful observation of a number of cases of acne would seem to indicate that there are three underlying causes in practically every case, namely, an abnormally low blood serum resistance to coccic infection; an abnormal secretion of the sebaceous glands; and what may be called a lowered local resistance to coccic infection.

By this latter expression, we mean that the patient afflicted with an acneform eruption usually has it continuously or repeatedly on the same area of his body, e.g., face, front of chest, back of chest, etc. Just how to explain or interpret this local skin sensitivity, and whether or not it has any relationship with the conception of a shock tissue in allergic conditions, are subjects outside the scope of this paper.

If the above explanation of the three chief causes of acne is true, it will follow that reasonable attempts to remove all three causes *synchronously* should result in cures in practically 100 per cent of the cases. This seems to have been so in the case histories reported briefly below. The treatment in all the cases recorded has been practically the same, and is as follows.

*Lowered blood serum resistance to coccic infection.*—This is raised by giving ascending doses of mixed vaccine. The vaccine which I have used is a sensitized stock vaccine, containing *Staph. aureus* and *albus*, as well as streptococci (several varieties), *B. coli*, and three varieties of pneumococcus.\* We presume that good results could also be obtained by the intelligent use of other good stock vaccines, or autogenous vaccines, and probably, in a case where the infection is entirely staphylococcal, a very good result could be obtained by the use of a staphylococcus toxoid.

In regard to the use of vaccines in general it is perhaps well to point out that there are several common causes for failure with their use. Rather than discuss this more general subject, let there be stated here rather dogmatically

\* Prepared by Mulford Biological Laboratories under the name "Staphylo-serobacterin mixed".

a few rules for the use of any vaccine. (1) The vaccine used must be potent, that is, capable of stimulating the immunizing activities of tissues, cells, and body fluids. Apparently, some methods of preparation of vaccines render them rather impotent. (2) The vaccine must be administered subcutaneously, not intradermally, and not intramuscularly. (3) It must be administered in increasing doses; the final dose must be sufficiently large for the individual case; and it is often necessary not only to reach a fairly large dosage, but to administer this dosage repeatedly at suitable intervals, thus continuing to stimulate the body resistance until the local focus of infection has been adequately dealt with.

*Faulty secretion of the sebaceous glands.*—Two things are done to overcome this difficulty. Acting on the basis of numerous published reports of apparent success in the treatment of acne by inoculation of anterior-pituitary-like sex hormone from pregnancy urine, various commercial preparations of this substance have been used in the cases reported. The dosage has been average to small (rather than large) and usually at weekly intervals, until the symptoms have shown a decided remission. A lotion containing sulphur was also applied once or twice a day. One old hospital prescription known as *lotio alba*, and a proprietary preparation, seem to give equally good results. The explanation usually given for the benefit of sulphur in acne is that it dissolves or softens the sticky secretion which more or less plugs the mouths of the sebaceous glands.

*Lowered local resistance to coccic infection.*—It is possible that the local application of sulphur lotion has something to do with reducing the local sensitivity; possibly its antiseptic value is not inconsiderable. In addition patients are told to carry out the following orders at least morning and night. Wash the affected area with hot soapy water, rinse away the soap thoroughly with warm water, and then douche the skin with cold water. Mop dry, and apply the sulphur lotion.

It is quite true that a number of the cases listed below would probably have responded to one or more of the above-mentioned treatments, but on the other hand, it seems worthy of note that in several, one or more of these things had already been done with no apparent success. In what was probably the worst case of all every one of these treatments had been employed, one

at a time, over a period of about two years. The patient felt that she was worse at the end of that time. Employing the above treatment in its entirety produced noticeable benefit in this case in about a month, marked benefit in two or three months, and a practical cure in about six months. She has remained "cured" for several years.

In the following records, "routine treatment" means sensitized vaccine, hormone, and local treatment as above described.

#### CASE HISTORIES

Mrs. E.D., aged 36, female. For about two years she had noticed a slight rash on her face at the time of menstruation. During the last several months had remained all the time. No relevant history was discovered. Diagnosis.—Acneform eruption associated with hormone imbalance. Treated with weekly injections of anterior-pituitary-like sex hormone, ointment, and sulphur lotion. (No vaccine.) Much improvement in one month, and practically no rash at all at the end of two months. Two months later some rash re-appeared. Six weeks of similar treatment again resulted in improvement, but that time it was noted that the patient had sinusitis, and on the subsequent weekly visits she was given an ascending course of mixed vaccine. The rash which recurred had some of the appearances of eczema, but the patient was discharged as cured eight weeks after the vaccine was begun.

E.W., aged 17, male. Severe acneform eruption on face. The chest was much scarred and covered with numerous "pimples". Started at once on the routine treatment outlined above; definite improvement noted within two weeks. At the end of six weeks, when the largest dose of vaccine ordinarily used had been reached, it was recorded on his case history that there were scarcely any new "pimples". The patient made four visits during the next three months, on two of which the largest dose of vaccine was repeated. On the final call his face was practically normal. Scars were still showing on his arms and his chest.

M.S., aged 16, female. Had a rash on lower part of her face practically constantly for about one year. Given routine treatment, plus iron capsules for anæmia. At the end of six treatments, and a period of three months, there was only a slight suggestion of an eruption, and in another month the patient was considered cured.

H.M., aged 18, male. Had a papular eruption and black-heads on his face for two years. Much worse, with lumpy spots, the last month or two. Given a course of treatment over a period of six weeks. He did not return to the clinic, presumably because his home was a considerable distance away. On enquiry by letter, he replied that his face was about the same for another year or two.

E.M., aged 22, female, student nurse. Acneform eruption on chin for over three weeks. After eight treatments with vaccine and hormone, there was marked improvement, only a few bluish tinged spots remaining where the eruption had been. During the next three months, she received occasional doses of hormone. Four months after discontinuing the vaccine, a small series of treatments with vaccine was given on account of the appearance of one or two new papules. Three months later another course of vaccine and hormone was given for the same reason. (This case responded each time to treatment, but for a period of almost a year showed a tendency to slight recurrences if and when treatment was discontinued. The final result was good.)

M.M., aged 23, female. Acneform eruption on the chin for four or five years. She was given routine treatment on six occasions, at intervals of one week. Improvement began following the first treatment, and continued throughout the course.

L.M., aged 24, female, nurse. Complained of having occasional "pimples" on cheeks, especially about the time of menstruation. Recently, the condition had been worse, with considerable rash being present, and a small "boil" or two on the back. Given a routine treatment of vaccine and hormone at practically weekly intervals for eleven weeks, the face condition improved, but the patient continued to have the occasional acute infection on the back and back of the neck. She reported a severe reaction from the last dose of vaccine, which was given by an intern, and, unfortunately, given intra-muscularly. Under local treatment accompanied by three inoculations of colloidal manganese and some more vaccine given sub-cutaneously, the back and neck improved greatly.

(Blood sugar in this case was a low normal, and a smear taken from a pustule on the back of the neck showed a few Gram-positive cocci in pairs, and small clusters. The manganese probably had a good deal to do with the ultimate cure of the infection.)

H.K., aged 17, female. Had a rash on face for several years, sometimes papular, sometimes pustular; usually worse during menstruation. She was given routine treatment over a period of seven weeks, and was much better at the end of two weeks. She was discharged as cured when she received her sixth dose of vaccine on the sixth and final visit.

I.H., aged 19, male. Had some rash on his face for two years, and a severe out-cropping on his back for the last two months. He received routine treatment for five visits. He was much improved at the end of a month's time. He did not return for further treatment.

V.G., aged 18, male. Acneform eruption on face and chest for four years. He was given routine treatment with definite improvement at the end of two weeks, and marked improvement at the end of a month. He continued to attend the clinic twice a month. At the end of five months he seemed practically cured. He did not return, although told to do so if there was any recurrence.

J.C., aged 18, male. Had an acneform eruption on face, neck, and back. Smear of pus reported by laboratory staff as *Staph. aureus*. He was given six routine treatments with definite improvement. He did not return to the clinic.

Mrs. A.C., aged 36, female. Acneform eruption and dermatitis across bridge of the nose. It was the third attack of this eruption. She was given routine treatment, and four weeks after first attendance had a bad tooth extracted. She was much improved at the end of six weeks' treatment, and at the end of three months had no rash on the face.

G.B., student nurse. Had an acneform eruption on left cheek. She was given routine treatment on five occasions with improvement. As she left the hospital at that time, treatment could not be continued.

C.B., aged 17, female. Had a papular and occasionally pustular rash on chest, face, and back for over a year. She was given routine treatment, and her face was improved at the end of three weeks. A month later, some recurrence was noted on her chest, but three treatments cleared the condition up entirely. (At the end of that month it was noted that during the course of treatment, this patient became much more energetic than formerly, and said she "felt very much better". This is in line with the effect which anterior-pituitary-like hormone often has on people who seem to lack it, and may also have been partly due to the removal of the toxic effect of chronic skin infection.)

R.B., aged 17, female. Had a beginning acneform eruption on neck and shoulders. She was given routine treatment with steady improvement, for a period of two months.

Mrs. R.C., aged 28, female. She had a papular rash on face, with occasional pustules, for seven years. The rash was said to be usually worse during menstruation. The patient had given up all pretense of treatment, and had about decided that neither doctors nor medicine could help. She was given routine treatment, and showed steady improvement. At the end of five weeks, her records state she was "much improved," and at the end of ten weeks, she was practically cured. (The psychic effect of treatment on this case was very interesting. It was noticed that as the rash began to fade, and the skin of the face became smooth, she began to pay more attention to her clothes and the care of her hair. In fact, her general appearance improved so greatly that we began to get the impression that we were operating a beauty parlour rather than a dermatology clinic.)

F.B., aged 16, male. Had an acneform eruption of considerable severity, chiefly on the back, with a few spots on the chest, and some small papules on the face for about six months. He received five treatments of hormone and vaccine, and was much improved. About five months later, he developed a fresh lot of "pimples" on the face and front of the chest. He was given six treatments of hormone, and four of staphylococcus toxoid. He had quite a severe local reaction to the toxoid, but improvement was not so great as formerly, so he was again given a course of treatment with mixed vaccine and hormone. The condition cleared up promptly with this latter procedure.

D.C., aged 21, female. Mild acneform eruption, chiefly on her face. It was usually worse during menstruation. It had a duration of over a year. Given the above routine treatment for four visits, with a complete clearing up of the disfigurement.

N.F., aged 17, female. Complaints in this case were amenorrhœa and an acneform eruption. After seven intra-muscular injections of anterior-pituitary-like sex hormone, both conditions were definitely improved.

E.M., aged 15, female. Complained of acneform eruption and amenorrhœa. She had begun menstruation before the age of thirteen, and was regular for over a year, but recently going much over time. She took a short course of seven doses of anterior-pituitary-like sex hormone, with a slight improvement, and then stopped treatment. Two years later, at the age of seventeen, she returned. The condition of her skin was very bad. Given prolonged treatment (routine) with improvement noted in two weeks, and slow, but definite improvement over six months. Treatment was discontinued by the patient for three months, when she again returned, and took treatment for six weeks. Although much better than formerly, the patient was not entirely well. Recently, however, she has had a number of septic teeth removed, with additional benefit. She has been left with considerable scarring.

P.C., aged 35, female. This was the worst case treated in this series. She had had an acneform eruption on her face for a good many years, and for several years it had been really severe. A tonsillectomy nine years before seemed to give some temporary improvement. Three years later, the rash broke out again. This time, x-ray treatment seemed to help somewhat. Three years after that (and three years before this consultation) she had an appendectomy on account of chronic abdominal pain. There was some improvement in the abdominal condition after this, but later quite bad attacks had developed again. The rash on the face was particularly bad after the operation. The patient had a "nervous break-down" after that.

She had not worked for several years previous to the consultation, and when she came to the office her face

was particularly bad, the skin on cheeks, chin, and bridge of nose being practically covered with papules, pustules, and large, inflamed nodules. The patient stated that the condition was at its worst during menstruation.

While in the hospital for the appendectomy, a degree of glycaemia was found, so for the last three years she had been avoiding any excess of sugar in her diet. She was started on the above routine treatment, with such additions when they seemed indicated, as germicidal soap, two or three doses of manganese intramuscularly, various laxative preparations, and mixed vitamin capsules. In six weeks improvement was noted, and a week later it was recorded on her record "much improved, no pustules". In another month the colour had faded from the inflamed areas, although during menstruation a few small pustules appeared.

Treatment was persisted in for the next four months, at approximately two week intervals. At the end of this period, or several months after beginning treatment, there was a slight recrudescence of a papular eruption.

More vigorous routine treatment was resumed, followed by a clearing up of the condition. Meanwhile, with the marked improvement in her appearance, this patient was able to resume employment, and during the next two years has worked regularly. On one or two occasions during that time, she has had a few tiny papules appear, but they seem to have been of no more importance than such as might be said to appear on persons with a more normal history. On close inspection, one can see slight remains of scarring, but this woman's face is practically normal in appearance today.

D.A., aged 19, female. Acneform eruptions around the nose and chin over one year. Worse around time of menstruation. Had taken some "acne tablets", containing tin, with some benefit. Started on routine treatment and two months later the rash had practically disappeared.

C.M., aged 16, female. Marked degree of acne of the face for one year. Had been taking "iron tonics". Went to see her family doctor who referred the case. Put on routine treatment. Showed definite improvement in 5 weeks. The rash was almost gone at the end of seven weeks. Treatment is being continued for a time.

A.R., aged 26, female. For six years had rather unsightly eruption on the face. The spots were not entirely typical of acne being rather more inclined to develop a form of pustular crust. There were some spots on the scalp. The patient suffered from considerable dysmenorrhoea. Routine treatment was begun on October 30th. Much improvement in the skin condition was noted by November 15th. On November 25th the patient mentioned that there had been much less pain during the last menstruation. She was married in December and was away from the city for some time. The condition of the rash became worse again, some especially annoying spots developed on the scalp. These yielded to further large doses of vaccine given at about 3-weekly intervals and an injection of the hormone about twice that often. By the last of February the patient could be considered cured.

E.O., aged 21, female. Referred by her family physician for a slight acneform eruption on both cheeks. Says

she always had a few pimples around time of menstruation, which began at age 12. For the last two months the rash has been decidedly worse. Routine treatment was administered, at slightly shorter intervals than usual, four visits being made in the course of nine days. On coming for the fifth treatment two weeks after her first visit the condition was so much improved that for all practical purposes the patient could be called cured, but treatment will be continued for a few more visits with the idea of adequately raising the blood serum resistance, and sufficiently modifying the activity of the sebaceous glands.

#### COMMENT

The fact that a number of women patients considered that the rash had a period of greater severity corresponding to a certain part of the menstrual cycle (in most of the cases, just before and during menstruation) seems to fit in with the theory that hormone imbalance plays a part in this condition. The one case which cleared up on hormone treatment alone corroborates this. The improvement in the morale of the average patient, either male or female, on relieving of this disfiguring condition is also worthy of note. In a good many cases, the patient's impression of the amount of disfigurement was gross exaggeration of the actual unsightliness present. The case F.B. would seem to indicate that mixed vaccine is more useful than staphylococcus toxoid in these cases. I have used toxoid to some extent, and have seen it used by others with definite benefit, but I consider that not only in acneform eruptions but in pustular conditions in general a mixed vaccine is a more reliable means of treatment.

#### SUMMARY

Twenty-five cases of acneform eruptions are described, in which routine treatment has produced a cure, or marked amelioration of the symptoms in all but one. That case did not return for sufficient treatment. Such a routine treatment of what is usually a prolonged and intractable condition, appears to have definite advantages over the isolated use of individual "specifics", each of which, while undoubtedly giving a percentage of cures, also fails in too large a percentage of cases.

Kings and generals are often remembered as much for their deaths as for their lives, for their misfortunes as for their successes. The hero of Thermopylae was Leonidas, not Xerxes; Alexander's empire fell to pieces at his death. Napoleon was a great genius, though no

hero. But what became of all his victories? They passed away like the smoke of his guns, and he left France weaker, poorer, smaller than he found her. The most lasting result of his genius is no military glory but the Code Napoleon.—Sir John Lubbock.

## Case Report

### SULFAPYRIDINE IN ACTINOMYCOSIS

By MAJOR H. S. MITCHELL, R.C.A.M.C.

Previous to the clinical use of the sulfonamide group of drugs, the treatment of actinomycosis was unsettled. A variety of unrelated drugs, alone or combined with surgical intervention, were employed, and the prognosis was, generally speaking, quite poor. The incidence of actinomycosis is low, but there has been enough evidence presented to indicate that the sulfonamides are the most helpful of all substances hitherto used in the treatment of this disease. The following case is of interest.

K.R., a girl, aged 12 years, came under our care November 15, 1940. She was thin, pale and underdeveloped. There were multiple draining sinuses, in the groins, and in the lumbosacral regions. There were healed scars on the neck and on the ventral and dorsal aspects of the torso. The liver was slightly enlarged on palpation and percussion. The ribs in the left lower portion of the thorax were retracted and much less mobile than those on the right. The signs on examination in the left chest were those of thickened pleura, or possibly fluid, extending from the base up to the mid-scapular region. The temperature was normal.

Information available was to the effect that the disease first made its appearance in a rib on the left side in January, 1938, the "bacterium necrophorum" having been isolated from the lesions. Treatment had included the administration of tincture of iodine, orally actinomycosis vaccine (up to 5 million fragments weekly) hypodermically, and several blood transfusions. There had been between thirty and forty sinuses during the illness, and the disease was extending with gradually increasing systemic effects and disability.

Oral administration of sulfanilamide was instituted. After several days, an estimation of the blood level revealed only a trace of the drug in the blood (considerably less than one milligram per cent). Investigation disclosed that the child was swallowing negligible quantities of the drug. The situation was corrected and sulfapyridine was used. From December 16, 1941, to December 26, 1941, she ingested 225 grains of sulfapyridine. The sinuses dried up, and their orifices were healed within three weeks of the commencement of sulfapyridine. Unfortunately, estimations of the blood levels at this time were unobtainable. Between January

13, 1941, and January 26, 1941, she was given 495 grains of sulfapyridine. The fluid intake was carefully supervised and the urine frequently examined. No urinary tract complications occurred. The white blood cell count was as high as 12,500 and did not fall below 7,400. Weight was gained rapidly, the secondary anaemia improved and the physical findings in the chest improved rapidly.

She was discharged from hospital after her second course in January, 1941, and has returned for periodic observation. She has had no recurrence and no signs or symptoms of the disease. The liver is of normal size, and general improvement has been steady. She was last seen on August 15, 1941. At this time, there was no evidence of any persistence or recurrence of the disease, and improvement in general health has been progressive. She now leads a quite normal life.

As far as I have been able to find, no failures in the use of the sulfonamide group in actinomycosis are reported. That failures do apparently occur, one knows of clinicians who can testify. Causes of failure may of course lie in the administration and absorption of the drug; but the difficulties of identification of the actinomyces are not sufficiently realized by clinicians. With reference to this latter point, some laboratory work reported by Hemmens and Dack indicated a difference in the pathogenicity of the human and bovine strains in rabbits. In certain instances, actinomyces recovered from a sinus or other lesion may simply be a saprophytic, or non-pathogenic type. Therefore, the simple demonstration of a ray fungus from a lesion is not in itself sufficient proof of specificity of the organism as the pathogenic agent, without identification of the species of the organism isolated, and the exclusion of other pathogenic organisms.

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Crafty men condemn studies; simple men admire them, and wise men use them, for they teach not their own use; but that there is a wisdom without them, and above them, won by observation.—Bacon.

"You cannot imagine how far a little observation,

carefully made by a man not tied up to the four humours; or sal, sulphur, and mercury: or to acid and alkali, which has of late prevailed, will carry a man in the curing of diseases, though very stubborn and dangerous, and that with very little and common things, and almost no medicine at all."—John Locke.

## Clinical and Laboratory Notes

### A MODIFICATION OF THE BANJO SPLINT

By C. S. WILSON

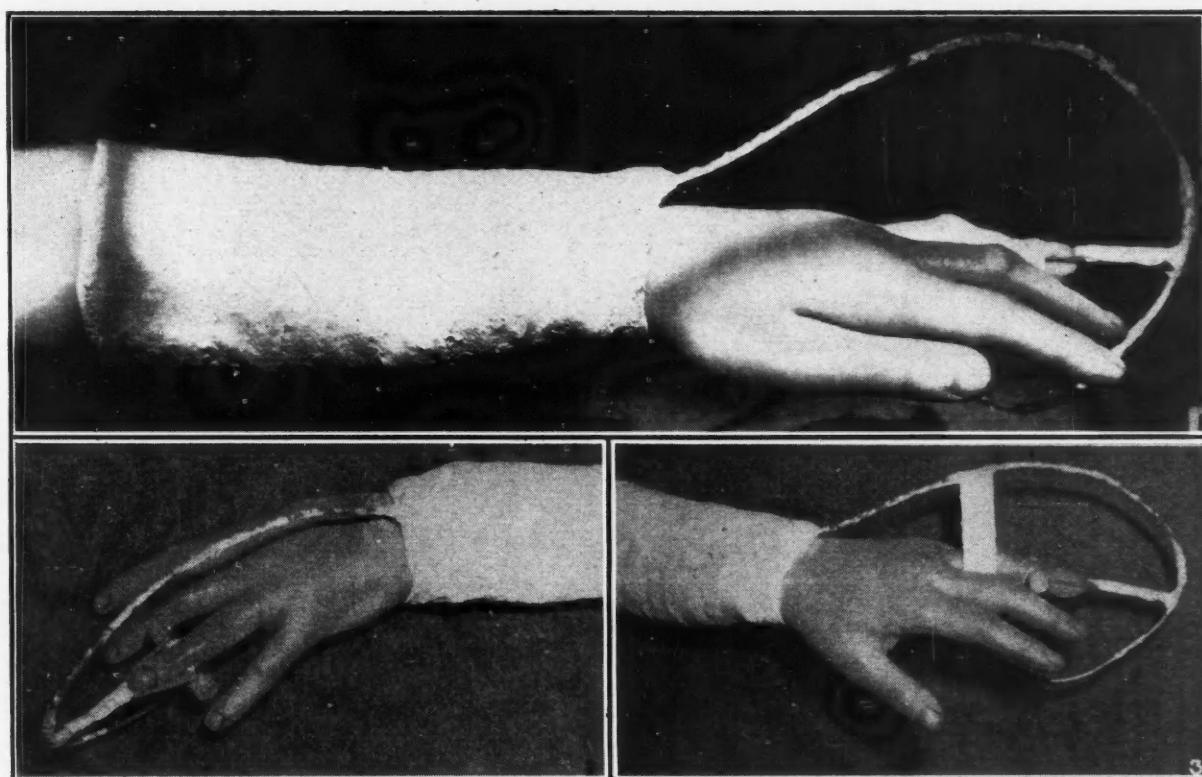
*Squadron Leader, R.C.A.F. Medical Services*

We have had a variety of injuries at the Technical Training School. These occur in the shops and on the athletic fields. Not the least of these have been fractures of the phalanges with joint involvement and with, in many instances, interphalangeal joint dislocation.

Unfortunately, in some instances the airmen have felt that the injury was merely a joint

In applying the splint the forearm is usually shaved and the plaster applied without padding from the elbow to the wrist. This need not be heavy, but the distal end into which the wire is set should be thicker. Then a piece of pliable wire is bent into the loop and its ends incorporated into the plaster. This is done, unlike the banjo splint, through an antero-posterior plane and directly dorsal and palmar to the fractured digit (Fig. 1).

Traction may then be applied in any manner desired. We have found skeletal traction of the most use. This has been secured with a



sprain and have delayed even for thirty to sixty days in reporting to the medical officer. Thus we have encountered many with dislocation, swelling, and induration sufficient to cause complete ankylosis of the joint involved.

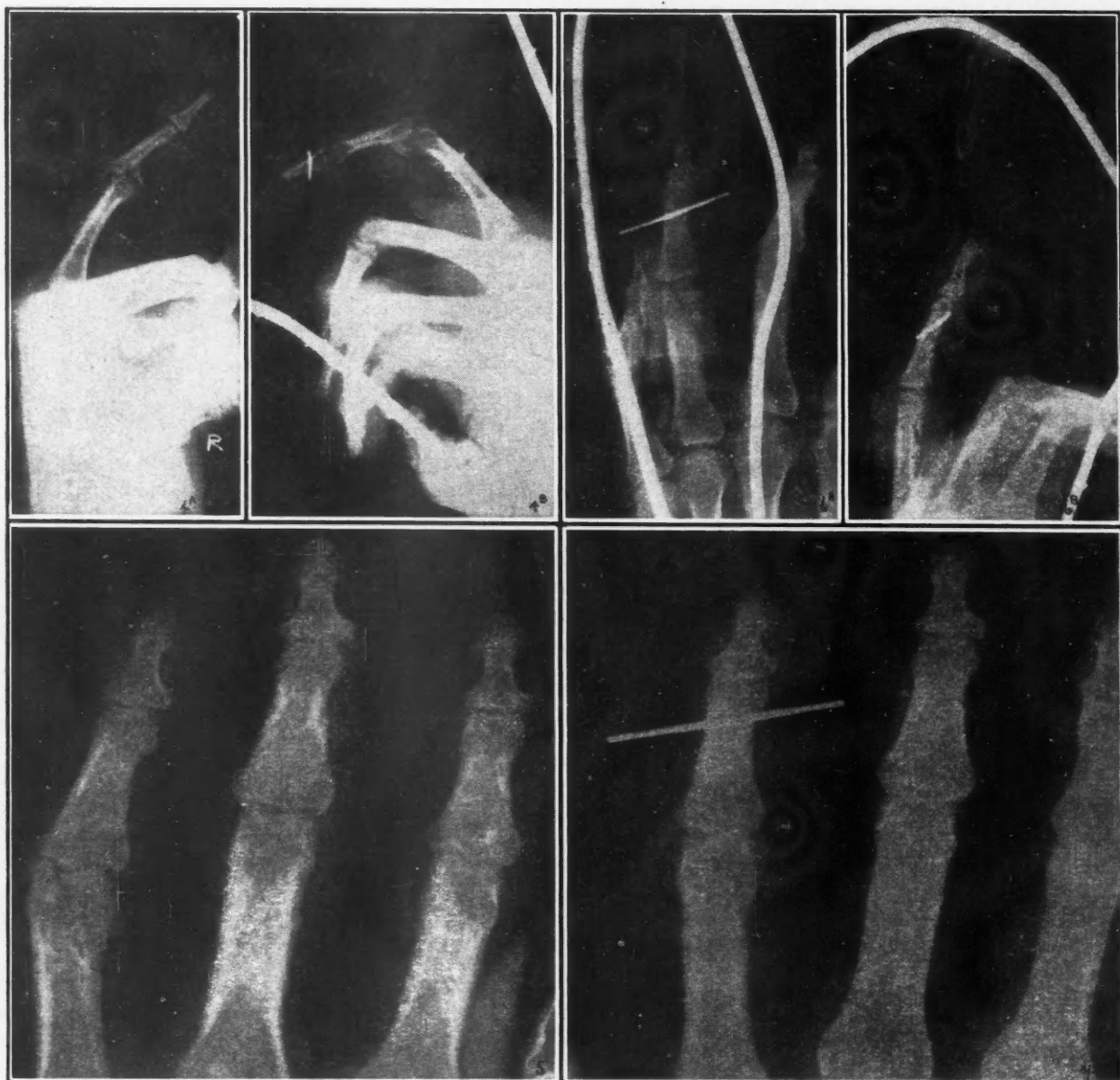
It followed that the only hope, in many, slight, of securing a functioning finger was a sequence of traction to free the dislocation, removal of fragments at open operation if necessary, followed by counter-traction and flexion for a period, and finally physiotherapy and movement. It is with a method of securing traction and countertraction that I wish to deal.

While treating these cases with the time-honoured banjo splint it occurred to me that this might be modified to advantage. This modification I have made use of since and feel that it has many advantages.

small pin through the phalanx to the ends of which an ordinary rubber band has been fixed and the latter, with the required amount of pull, attached by adhesive to the wire loop. Any tendency to radial or ulnar deviation can be corrected, usually by bending the wire in the proper direction (Fig. 2). A required amount of extension or flexion may be obtained by bending the loop anteriorly or posteriorly *in toto*.

Countertraction and counterfixation when required may be secured with an adhesive support from the wire posteriorly (Fig. 3) or by skeletal traction (Fig. 4B). The loop can be widened and the degree of flexion increased to a right angle and traction maintained to the palmar portion of the wire loop (Fig. 4B).

Besides the ease of watching and manipulating the injured finger, and adjusting the splint there



is the patient's viewpoint. The particular feature which appeals to him is that, regardless of the finger involved those intact are free and he can use them in reading, eating and numerous other tasks which would be impossible with the older banjo type. The only difficulty we have encountered has been, in some instances an œdema of the hand which has given rise to little or no discomfort and subsides, as a rule, in a short time. This can be lessened by the use of a narrow piece of felt encircling the wrist under the distal end of the cast.

I shall report two cases to illustrate my remarks:—

#### CASE 1

This was an airman who caught a fast grounder during a game of softball. The resultant injury was not discovered for over four weeks. A fracture disloca-

tion of the first interphalangeal joint had resulted in complete ankylosis of the finger (Fig. 4A). Following reduction of the dislocation by skeletal and elastic traction a second pin was put through the first phalanx and flexion obtained (Fig. 4B). Later the thin anterior fragment was removed at operation. While the end result in this instance was not good the splint served its purpose perfectly.

#### CASE 2

A member of the Army Service Corps suffered a fracture of the distal end of the first phalanx of the ring finger. This involved the joint and the small fragment was displaced proximally, with resulting radial deviation (Fig. 5). This injury was x-rayed after 48 hours. Skeletal traction was at once applied. Check-up showed over-pull (Fig. 6A) and hyperextension of the small fragment (Fig. 6B). A slight pull was put under the small fragment (Fig. 7) and the terminal traction lessened and point of pull lowered on the loop with an excellent result (Fig. 7).



## Editorial

### MORE ON SILENT REVOLUTIONS

RECENTLY we drew attention editorially to certain silent revolutions which bid fair to disturb materially our present social, political, and financial order. The medical profession is not exempt from these. If these movements continue, as they undoubtedly will, they will require special study and careful handling. We referred at that time to the gradual ageing of our population. The subject is so large and has so many connotations that only a sketchy presentation of it could be attempted.

If we take the age of sixty-five years as marking the onset of old age statisticians have stated that the proportion of our population falling within the age-period of sixty-five and upward is steadily increasing. Forty years ago 4.1 per cent of the population were within this bracket; now 6.3 per cent. It is estimated that if present trends continue the figure in 1980 will be 14.4 per cent. This is in great part due to better conditions of childbirth and maternal welfare and the more scientific handling of childhood. Eventually, if we carry on along the same lines, we may expect that 75 per cent of the children will survive to reach the age of sixty-five. With regard to the eventual result this will, of course be partially counteracted by the falling birth-rate. Doubtless, too, improved methods of treatment and a more enlightened state of mind on matters of prevention and treatment on the part of the general public will tend to preserve the elderly to more advanced years. It is significant that geriatrics now is coming more and more into the limelight.

Corroborating all this may be mentioned the fact that in many places hospitals for mental diseases (many of which are characteristic of the aged) are being overtaxed. Thus, in Massachusetts, 25 per cent of the new admissions to these institutions and 30 per cent of the resident population are persons sixty years of age or older.

In support of this, too, we may cite the change that has occurred in connection with certain principal diseases. Today six con-

ditions stand out as causing more than half of the morbidity. Forty years ago they constituted only 20 per cent. Then they ranked in order of frequency as follows, tuberculosis; pneumonia, nephritis; heart disease; violence; cerebral hæmorrhage; cancer; diabetes; arteriosclerosis. Now, the order has changed. Tuberculosis has dropped from first to seventh place. Heart disease has come up from fourth to first place. Diabetes which used to constitute 23.8 deaths per 100,000 has risen from the twenty-seventh place to the ninth. Cancer has risen from the eighth to second place; cerebral hæmorrhage, once in seventh place, is now in the fourth; pneumonia, once in the second place, is now in the sixth; arteriosclerosis, once thirty-fourth, is now tenth.

It will be observed that, speaking generally, the diseases that nowadays exact the highest toll are those that are most often associated with advanced years. The notable exception is pneumonia which reflects the improvement brought about by the new chemotherapeutics. From the therapeutic standpoint the other diseases mentioned are about where they were. Cancer, in spite of some improvement in the results of treatment in certain types, is likely to increase in the future, owing to the great increase of elderly people. Accidents, including falls, are potent causes for a considerable portion of the mortality throughout life. At the ages of sixty-five and over 60 per cent of the fatal accidents result from falls. Old age, then, is characterized not only by high mortality but by a high rate of disabling disease.

Most of the diseases mentioned above are difficult, if not impossible, to cure in the ordinary sense of that term, except in rare instances. And it would seem hardly worth while, even if it were possible, to prolong life unless at the same time we render our patients comfortable and happy. Much of the medical work in the future will be a matter of cobbling. This will necessitate a wider application of some of the specialties,

such as orthopaedics and physiotherapy, radiology, balneology, psychiatry, better methods of nursing, and improvements in social and family relations. Many old people are more or less blind and deaf, and some at least could be helped. Also, much could be done to lighten the disabilities that accompany so-called chronic rheumatism and rheumatoid arthritis. All these carry with them long periods of disability entailing much home nursing and institutional care. And these cost money. Mental deterioration, so common in the aged, and often regarded as beyond help can sometimes be improved by suitable measures. In this particular we were struck by a recent article by Drs. G. E. Reed and K. Stern of the Protestant Hospital, Verdun, Que., which appears in the March issue of the *Journal*.<sup>1</sup> It is entitled

1. REED, G. E. AND STERN, K.: The treatment, pathology, and prevention of mental disorders in the aged, *Canad. M. Ass. J.*, 1942, 46: 249.

"The Treatment, Pathology, and Prevention of Mental Disorders in the Aged", and well deserves attentive study. It should be read in its entirety, but we may here call attention to certain important conclusions reached by them.

"Not all psychoses in the aged should be regarded as incurable. There are indications that preventive medicine will find application in this field. A general review is given of factors contributing to mental disorders of the senile group which are accessible to therapeutic measures. Certain determining psychological causes can be overcome by readjustment. Contributing nutritional and metabolic factors can be dealt with by conservative use of medication and by diet." And they cite illustrative cases.

It is evident that in the future the therapeutic field of the individual doctor will cover a much wider range than before.

A.G.N.

## Editorial Comments

### Precaution in Transfusions

A recent fatality has drawn attention to the necessity for yet further precaution in the giving of blood transfusions. By error in a city hospital blood of the wrong group was taken from the supplies stored in the blood bank and administered to a young child as a post-operative measure, with fatal results. The bottles were correctly marked, and the error in selecting the wrong one is frankly admitted. The suggestion was made at the coroner's inquest that steps should be taken to mark the containers of the various blood groups by distinguishing colours. This suggestion would be an extra safeguard in a system which cannot be too carefully protected. Apparently the method of colouring the bottles according to the groups they contain is in vogue in some munition plants. We would only add that there should be standardization of the colours used in the various institutions.

H.E.M.

### The Treatment of "Athlete's Foot"

We would draw attention to a letter in this issue (p. 615) describing fatal results from the use of pure phenol and camphor in the treatment of "athlete's foot". A recent popularization of this form of treatment in the "Reader's Digest" (May, 1942) has apparently resulted in considerable public interest, and many inquiries about it are being made. The original note on this form of treatment, which appeared

in the *J. Am. M. Ass.* (Dec. 6, 1941) was written with all the restraint and caution to which we are accustomed in such communications. We think that it is unfortunate that in an attempt to make a "story" of it the impression should be given that this method of treatment is as simple as it is made to appear; or as effective. Experience of dermatologists does not support the conclusion that it will cure ringworm any more than do the numerous other accepted remedies. There is also the danger associated with its use, an extreme example of which is given by our correspondent.

H.E.M.

### CAMSI

OPA; WPB; CIO; UCWOC; AFL; USO; WREN; NWLB; CWVRC; WAAF; FANY. These are some, but not all, of the current abbreviations in fashion in the press at the present time. The average man is likely to find himself bogged in the slough of this truncated nomenclature, and what is intended to be the short way round turns out to be the long road after all. Now we add one more to the long list—CAMSI. The young medical men, formerly conservative, have succumbed to the prevailing tendency. For, CAMSI, being interpreted, means *Journal of the Canadian Association of Medical Students and Interns*. So far as we know, this is the first and only instance in which a seriously-minded medical publication has been content to hide its light under somewhat of a bushel. How-

ever, CAMSI will doubtless survive its handicap. Joking apart, however, CAMSI has its place and can fill it admirably. Its purposes are altogether worthy and, we believe, will be exposed worthily.

We are told that its object "shall be to publish material pertaining to the aims and business of CAMSI, the advancement of social medicine and the scientific and cultural interests of medical students and interns". Altogether, laudable! "We pledge that we shall not be found wanting in our readiness to give everything, our energy, skill, and lives to carry through all the duties we are called to perform in assuring victory to our just cause in this war." Again, most laudable!

Perhaps we may be permitted to make one suggestion which, if adopted, will in our opinion make the program of the journal even better. The editors say they will publish in addition to material written by their own members on student and intern problems papers of broad interest by leaders in the various fields of medicine. We hope that this intention will be carried out with discretion. Surely, it is unnecessary and beyond the scope of the new journal to publish articles of purely medical and scientific interest, even if they be contributed by those whom we all recognize as foremost authorities on their subjects. We may quote the opinion of a former senior professor in McGill University, now deceased, who said that the world would be none the loser if 90 per cent of the scientific articles published each year were consigned to the flames in the public square. Rather severe, but, doubtless, justifiable! Perhaps the situation is saved for CAMSI by its inclusion of the qualification, papers of "broad interest". We hope this idea will prevail. We quote with approval some views expressed by Dr. Henry Sigerist, of Johns Hopkins University, who has a thought-provoking article in the first issue of CAMSI, now

before us, which seems to sound the key-note in this matter. He says "I have shocked medical audiences more than once by saying that medicine is not so much a *natural* as a *social* science" (italics ours). He concludes his article thus "I think that the sociological approach to the history of medicine not only gives us a better understanding of the past but can also help us in planning for the future." The scientific side of medicine may be trusted to take care of itself.

The future of medicine is in the hands of the present-day medical students and interns. We talk of after-war reconstruction. Medicine is now being reconstructed before our eyes. We look to the junior members of our profession for ultimate leadership, and CAMSI can do much to ensure that that leadership will be sane.

A.G.N.

### "Parergon"

There must be great pleasure in getting up "Parergon", the volume of illustrations issued by Mead Johnson & Company to show the artistic capacities amongst medical men. One naturally is impressed by the high quality of the work thus exhibited, but the selection and arrangement of the pictures also is unusually excellent. We note a reproduction of an oil by the late Sir Frederick Banting, "Quebec Village" and another by Dr. Harvey Agnew, "Early Snow in Northern Ontario", whose genius with the pencil is so well known. Dr. F. B. Bowman, of Hamilton, also contributes a water colour, "North of the Border".

Some day perhaps we may look for the much more ambitious project of producing the illustrations in colour, but that may be asking for more than can be reasonably expected. The volume as it is presents such a feeling of pleasure that one can only express our gratitude to Messrs. Mead Johnson for their striking accomplishment.

## Men and Books

### RHEUMATISM, PAST AND PRESENT, IN THE LIGHT OF PALÆO- PATHOLOGY AND SOCIAL PRE-HISTORY

BY EGILL SNORRI SNORRASON, M.D.  
*Copenhagen, Denmark*

When the subject-matter of certain studies in this field is presented in the form of an article, my one excuse is that the deeper I penetrated the subject, the more it seemed to confirm the sentence, written in gold letters on the Anatomical Institute of Bâle before its molestation through air-bombs in the war of 1914-18: *mortui vivos docent*—the dead instruct the living!

Concurrent, though widely different, causes contribute at present to an ever growing pre-occupation with the so-called rheumatic problems, an interest which, so far as medical science is concerned, is due to an increasing command of various methods of investigation and which, so far as society at large is concerned, is determined by a clearer perception of the economic and social problems arising out of rheumatic afflictions.

If the question of the age of rheumatism is raised, one must enter the purlieus of a comparatively new, most interesting and rapidly developing science, which Sir Marc Armand Ruffer named "Palæopathology"—"the science which is destined to shed new light on old diseases", as Moodie puts it.

Little more than a hundred years ago, in 1825, the German surgeon von Walther described some pleistocene bones found at Isarlohn in Prussia. They belonged to cave bears and cave lions and showed *inter alia* a bridge-formation of osteophytes between the vertebrae of the spinal column. He did not fail to stress the fact that he was probably the first to describe the pathology of animals which had been dead for thousands of years. Esper, in 1774, and Cuvier, about 1810, however, had forestalled him, but nevertheless he is the first to advance a theory concerning the pathogenesis of these osteoarthritic changes, in so far as he concludes: "We have no historical evidence to show how old disease is, nor when it first assailed the poor and sinful human race. But disease is in any case an inborn evil, and since disease may torture the sons and daughters because of the misdeeds of their fathers, so is disease indeed the heritage of sin." In justice to him it must, however, be added that apart from his views on original sin he also held that trauma and climatic conditions might play a part in the etiology of the cases.

It is true that in the following years certain new discoveries were described, but nothing decisive was done till the German pathologist, R. Virchow, in 1895 published his investigations of the remains of pleistocene mammals found in Prussian caverns. It is particularly with the cave bear (*Ursus spelæus*) that Virchow is concerned. He shows that it suffered exceedingly from a disease which closely resembles the human spondylitis deformans. He finds large exostoses upon the bodies of the vertebra, but quite unaffected and intact articulations in the spinal column. This disease he called *Höhlengicht* (cave gout).

Amongst the outstanding personalities of the world of palæopathology who must be named, is the English scientist, Marc Armand Ruffer, who during the first score of years of our century conducted extensive investigations on Egyptian mummies from pre-dynastic ages to the commencement of the Christian era, a period of some 6,000 years—an excellently preserved material, indeed. It has even been possible to examine their serological reactions, without startling results, however. He found that, besides articular and dental diseases, the ancient Egyptians were afflicted with pneumonia, anthracosis pulmonum, arteriosclerosis in the preserved blood-vessels, appendicitis, cirrhosis hepatis, ureter- and bladder-stones and many more well-known diseases.

By close examination of bones remaining from the oldest ages it has been possible to describe accurately the pathology of cases belonging to ages much older than those from which we normally derive our first descriptions of diseases, i.e., from the Egyptians and from Hippocrates. Just as in our own days, we find traces of tumours, osteomyelitis, fractures, articular dis-

eases and—the nearer we get to modern times—also syphilis, tuberculosis and rachitis.

Before undertaking the description of the various discoveries I may, perhaps, interject the remark that I, of course, have been precluded from personally examining the vast material of skeletons and bones existing all over the face of the earth, but have been obliged to base my investigations on the rich collections of original texts and photographs which I have been able to secure, and which I have had to examine very closely in my attempt at disclosing just what in every case is hidden behind the word "arthritis", whether this be used in American, English, French or German to describe any one of a number of articular diseases.

It is ascertained that even the oldest known types of mankind have suffered from articular rheumatism. The Neanderthal group from the Palæolithic period, represented by the discoveries at Krapina, Moustier, la Ferrassie, la Quina, Spy and—as its name shows—at Neanderthal, has its finest specimen in the skeleton from La Chapelle-aux-Saints (Fig. 1), described by Marcellin Boule. Pictures of this skeleton show osteophytes on the three lower cervical vertebrae and on the three upper thoracic vertebrae, and to a slighter degree on the lower lumbar vertebrae.

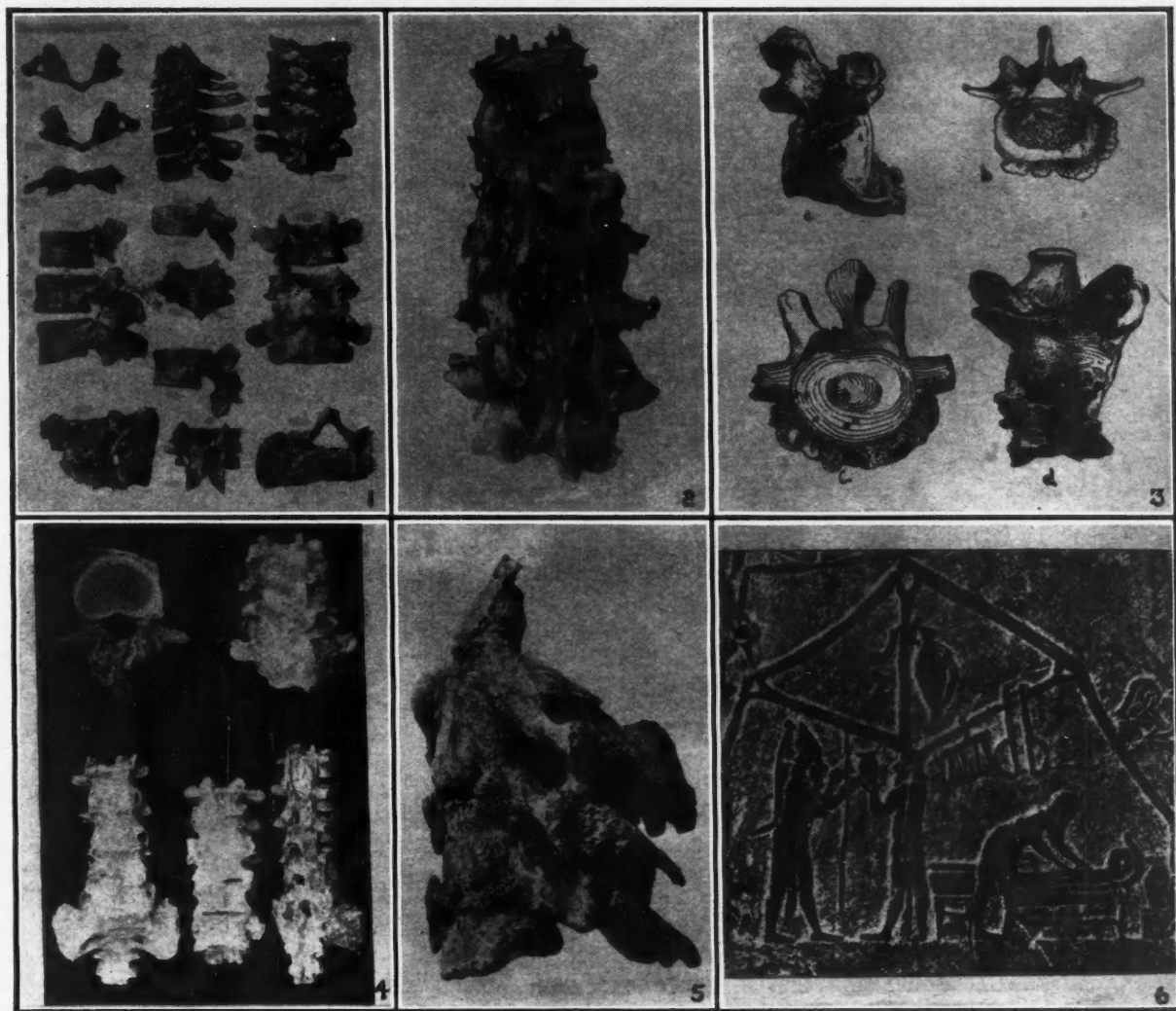
From the subsequent colder periods of Palæolithic times—the Aurignacian, the Solutrean and the Magdalenian—quite similar discoveries have been made.

Passing to Neolithicum, the number of discoveries of cave-dweller remains is much larger, so much so that it becomes possible to express the extent of articular diseases numerically. Investigations at Bazoges in France for instance have shown up to 20 per cent of the bones to be affected.

Spondylosis of precisely the same character as that existing in our times, even though much more violent, may be found in the material of Ruffer from ancient Egypt, of H. A. Nielsen from Denmark and of Hrdlicka from North America, Mexico and Peru (Fig. 2).

I have gathered the following evidence to show that spondylosis deformans was not a localized disease, but existed wherever on earth human beings of Palæolithic and Neolithic ages are to be found. In attempting a comparison of this disease—today only too well known as "old man's gout"—with present day conditions, certain essential differences will be found:

1. As to the number of the sufferers from spondylosis deformans the Bazoges remains had fixed it at 20 per cent, whereas Schmorl in our days (1931) found it in 42 per cent of 1,100 casually selected sections. By roentgenology as much as 60 per cent may be found. Thus Garvin found 67 per cent among men and 40 per cent among women by examination of 2,000 x-rays. Modern French investigations of present day conditions show only 15 per cent for both sexes.



2. In size the cases of spondylosis deformans found in the earliest stages of human history are rarely, if ever, equalled today.

3. The age of the victims of spondylosis deformans seems in the stone-ages to have been much lower than in our days, cases appearing at an age when the cranial sutures were not yet closed, *i.e.*, under 30 years of age, whilst it is now a rarity to find a victim amongst the very young. For the majority the age lies about 45 to 55 years for the male cases and about 50 to 55 years for the female cases. It must however, be taken into consideration that the average "expectation of life" was about 30 years in the stone-ages, whilst it is now about 60 years.

4. Finally a difference is found in the localization of the disease. The stone-age man from La Chapelle-aux-Saints was affected in the cervical region, the ancient Egyptians, irrespective of whether they lived in the heat of the second cataract or in the moisture of the Nile delta—and they, especially the fellahin, suffered greatly therefrom,—in the dorsal region, whilst the spondylosis of our days usually is situated in the lumbar region.

Not only the spondyloses plagued the peoples of the stone-age, though they must have produced fairly severe attacks of lumbago and

similar ailments. On the before-mentioned skeleton from La Chapelle-aux-Saints there are signs of osteoarthritis coxæ of the left hip. Similar cases may also be found in Ruffer's Egyptian and Moodie's Inca materials.

Whilst in our days osteoarthritis coxæ et genuum may appear somewhat more frequently than spondylosis deformans, the opposite was the case in the stone-ages. There are, however regions in this world where the arthroses are elsewhere located than is the case with the knee and hip lesions of the present-day population. Amongst the Patagonians the shoulders are particularly affected, whilst amongst the inhabitants of New Caledonia especially the jaw articulations suffer.

But this disabling disease did not only afflict mankind. As far back as in the Mesozoic age we find that the dinosaurs were affected. One of the so-called *diplodocus longus*, which might weigh some 40 tons and the head of which was only the size of a present-day dray-horse, with a brain the size of a closed fist, has left us remains showing osteophyte-like protuberances on vertebrae caudales XVII-XXI, *i.e.*, some five feet of the tail just in the place where this touched the ground. A post-fossilization fracture shows

that the articular surfaces of the vertebræ bore no sign of infection.

The wild animals of our day are seldom if ever affected by arthrosis, which only appears with the loss of liberty, for instance in animals living in zoological gardens, menageries, etc., but then also to a marked degree, apart from the fact that these animals also suffer from rachitis, arthritis and caries dentium.

The pathology of the animals of Neolithic times has been but little explored, but in the animals of the Palæolithic period arthrosis is very frequent. As mentioned before, von Walther, and especially Virchow, have described the rheumatism of the cave bears. Amongst some of these specimens the spondylosis is so pronounced that it looks as if the growths between the vertebræ were due to the solidification of a liquid mass poured over them. Also cave lions, reindeer, and sabre-tooth tigers suffered much from this disease. Not only was the spinal column subject to attack, but also the bones of the extremities show traces of "cavern gout". In all the cases the main characteristics remain the same (a) intact articular surfaces; (b) pronounced formation of osteophytes.

Moodie may be said to have produced a perfect, synthetic picture of the history of spondylosis deformans in the mammals—in which group he, in line with Linnaeus, places man—when he commences with vertebræ of the sabre-tooth tiger and the cave bear and uses a vertebra of a 5,000 year old human skeleton as a connecting link to wind up with modern man (Fig. 3). In so doing he has not covered the whole age of the known osteoarthritis, for it dates back some 100 million years to the dinosaur, continuing over Miocene Egyptian crocodiles and Pliocene camels to the before mentioned, relatively recent Pleistocene remains.

It is this latter group of discoveries which is responsible for having induced an audacious palæontologist to maintain that the pleistocene animals must have lived under the same conditions as the modern inmates of menageries and that *therefore* they must have been tamed by stone-age man. And, not content with this, the discovery of the miocene crocodile led him, inversely, to conclude that, *since* this crocodile had spondylosis deformans, then the human race must needs also have existed in miocene ages and tamed the crocodile with a view to its participation in religious rites. This mental flight is really too audacious!

It is well known that Tammann has produced a pathological condition in animals resembling spondylosis deformans by damaging the intervertebral disc, and Schmorl has shown that after the 17th to 18th year there is no circulation in the intervertebral discs, so that any damage suffered after this age consequently is irreparable. Trauma must therefore be of great importance in the etiology of spondylosis, since it will affect the circulation of the intervertebral discs, and the disease primarily seems attributable to the

degeneration of these. But why do we find the disease in such violent forms from the oldest ages up to and including the pleistocene age? I believe that this variation in degree must be considered in relation to climatic and dietetic changes, just as the lesser corporeal efforts of our days also play their part.

Schanz, for instance, considers the osteophytes as an opportune reaction of nature with a view to strengthening an over-strained column. He also shows that should an engineer design the shape of the osteophytes with a view to their serving as supports he would give them just their original form. In fact, the disease is generally found amongst those performing the hardest bodily toil, such as miners and farm labourers, and it is significant that *diplococus longus* is affected precisely in the "resting point" of the 28 to 29 feet long tail, *viz.*, in the point where this touched the ground. Amongst the Patagonians of our day the osteoarthritis especially affects their upper extremities, presumably because their life on horseback necessitates the constant use of the arms for carrying packs and handling reins. On the other hand the New Caledonians are affected in the jaw articulations as a consequence of their eating particularly hard and coarse foods. That the women of the Aurignacian period were subject to arthrosis of the hip-joint is shown by the well-known pictures from Willendorf, L'abri de Laussel and elsewhere, whereas the men are always shown as slim and elegant hunters!

The famous American rheumatologist, Pemberton, considers the diseases which here are called arthrosis and arthritis as "the two acts of a tragedy which extends through the youth and the age of the *dramatis personæ*", since he only regards them as being at variance in respect of the age at which they occur, *viz.*, before, during or after middle age, but otherwise sees them as the clinical result of several different causes: infection, trauma, heredity, etc.

In Denmark, Brinch and Jarlov have been able to produce arthritis as well as arthrosis in rabbits through the injection of arthrophile streptococci without exposing the animals to trauma or any other of those conditions normally considered as conducive to arthrosis. When I mention this fact, it is because in the present memoir I have *only* followed the old theory of the importance of work and strain in the etiology of arthroses, and because in none of the cases mentioned have I found signs of infection in the locality of the arthrosis.

On the American as well as on the French and German side it has been maintained that the first types of men and animals were immune from diseases due to parasitism, especially those due to bacteria. In the case of pleistocene man the investigation of the remains so far discovered has disclosed no disease due to infection. There are neither infective arthritides nor diseases such as tuberculosis, syphilis, osteomyelitis or leprosy. Earlier animal types, such as the

dinosaur, may present traces of infective articular pathology, but so far as man is concerned only arthroses are found all through the palæolithic age.

The first known cases of arthritis appear in remains from Neolithicum. Spondylarthritis anchylopoetica is especially represented. As the illustration shows, we have a case from the French Neolithicum with ossification of ligamentum longitudinale anterius and ankylosis after infection of the articular surfaces of the processus articulares. The x-ray shows a transparency in the processus spinosus, which, according to Léri, is characteristic of spondylarthritis.

From Egypt Ruffer describes a very fine specimen, a man named Nefermaat from the III Dynasty (2980 to 2900 B.C.), found in a mastaba at Meydum (Fig. 4). It shows the vertebrae in one solid block from the fourth cervical vertebra to the os coccygis, in consequence of ossification of the anterior and posterior ligaments, and infective alterations in and around the articular processes. The intervertebral discs were neither ossified nor compressed, as is the case of spondylosis. It further showed affections of the shoulder, hip and knee articulations, but not of the smaller articulations. Unfortunately nothing is stated concerning the sacro-iliac articulation.

Ruffer and Rietti have described several similar cases from later periods in Egypt, as well from the Middle Kingdom and the Pharaonic Empire as from the times of Persian, Greek and Roman occupation. From the Danish Neolithicum a fine specimen, described by H. A. Nielsen, also exists (Fig. 5).

But not only spondylarthritis anchylopoetica existed in ancient Egypt. Diseases corresponding to our atrophic arthritis have also been found, although it has been difficult in all cases to show the relation of the minor bones to the remainder of the skeleton. In spite of this, infective disease has been found in and around the phalangeal articulations, but most frequently in the ankle-joint. How widespread this disease has been transpires from the fact that the hieroglyphic denoting "high age" is a cartouche showing a man deformed by atrophic arthritis.

At that, arthritis is not the only infective disease appearing at the close of Palæolithicum. When—as is here the case—the research is limited to the discovered bones, tuberculosis as well as syphilis, osteomyelitis and leprosy are found to have left their first traces in Neolithicum and the following thousands of years.

So far as tuberculosis is concerned it is peculiar that large numbers of cases are found in Egypt—as well in mummies of the pre-dynastic era as in those of the historical period—whilst it is rare outside of this territory. In France only 11 certain cases are found from Neolithicum and the Bronze and Iron ages. In Germany there are only a couple of cases, i.e., one from a mound near Heidelberg from about 5000 B.C. The first Scandinavian case is dated by Fürst

at about 1200 A.D. It has been supposed that this disease was introduced to the American Indians by the Europeans, but the discoveries by Hrdlicka amongst the pre-Columbian Indians from Missouri show that the disease existed before the discovery of America by Columbus. Pre-Columbian terracotta figures, showing cases of Pott's disease, have also been found, and similar clay figures are known in Egypt. It would seem as if this disease first appeared on a large scale in Egypt. In Europe it only appeared sporadically, subsequently spreading till in recent times it has penetrated everywhere. It would be interesting to know how frequently it occurred amongst the ancient Greeks—Hippocrates describes it in detail—or amongst the old Empires of Mesopotamia. This has so far not been an object for research.

As to syphilis the ground is less secure. The old theory, which still has its champions, is that *spirochaeta pallida* were first brought to Europe by Columbus' crews on their return from America in 1493 and later spread through the siege of Naples, 1494-95, by the French king Charles VIII. In support thereof we have from New Mexico, Peru, Argentine and from the "mound builders" in Ohio a number of discoveries of bones showing syphilitic disease. But it is interesting to note that in Solutré and in the Raymond discoveries in the Marne valley we have found bones which apparently show syphilitic alterations, e.g., a humerus and an ulna with indications of an osteomyelitis gummosa. Sectional microscopy of these bones from Neolithicum would seem to confirm the diagnosis. Michaëlis, who performed the microscopy of the Marne bones is further of the opinion that he has found a syphilitic femur and tibia in Nubia, dating from 1000 B.C., and he has described a couple of Bronze age cases from Transbaikalia. The difficulty consists, however, in verifying the cases, since similar bone alterations may be due to trauma, typhus, ulcers, varicosa, phosphonecrosis, and senile osteoporosis, but the cases cited should be beyond cavil.

Syphilis may therefore be presumed to have existed in Europe long before 1493, but without its present enormous dissemination. As in the case of tuberculosis it also first affects the human race in Neolithicum. It may even have been localized, or, if more widely spread, been of another and more benign type. In 1493 an outside factor makes its appearance and abruptly increases the virulence of the disease until it assumes an epidemic character. The German scientist Sticker is thus of the opinion that the Socrates busts give a fine reproduction of syphilis and hence that the disease was known to the Greeks and Romans.\*

\* Møller-Christensen has recently called my attention to an article by E. Hoffman, who at the end of a life-long investigation of the history of syphilis still concludes that syphilis must have originated in America, in so far as it should be an ordinary *framboesia*, which on transplantation to Europe by mutation (?) should have developed into syphilis.

As to the other diseases mentioned, leprosy and osteomyelitis, the former was well known in ancient Greece, elephantiasis Græcorum, whilst the latter, particularly in its traumatic form, appears with numerous cases in Neolithicum, whereas no human cases thereof are known from Palæolithicum!

It would therefore appear that during Neolithicum certain infective diseases arise, which have not formerly troubled mankind, however much this may have suffered otherwise from lumbago and other forms of rheumatism. I have here particularly stressed three of these—atrophy arthritis, tuberculosis and syphilis.

In conclusion it may be of interest briefly to mention the attempts made by stone age man at healing his articular disabilities. He had already comprehended the importance of sunlight, since he tried, as far as possible, to choose his cave-dwelling with a "southern exposure". This possibly accounts for the relatively fewer cases of rheumatism amongst men as compared with the cave-dwelling animals, which latter had to content themselves with the caverns disdained by man.

The first concrete evidence of treatment—apart from the Chinese massage and massage amongst the aboriginals, the origins of which it is difficult to date with any degree of certainty—comes from ancient Egypt. The important medical papyrus Ebers from 1550 B.C. contains several forms of treatment for rheumatic pains. In the reading by Ebbell it goes: "Another ointment for softening the muscles. Lad-anum, an unknown component of incense, the fruit of an unknown plant, coriander seed. It is rubbed in during many days." Other constituents of ointments were date-wine, salt, juniper berries, hyoseyamus rock-antelope fat, and pine tar. That the Egyptians also made use of sunlight is seen in the following passage: "Another means of softening the muscles. Oxtallow, lees of wine, onions, wall-soot, various fruits from Upper Egypt, incense and myrrh. The body is rubbed therewith and then placed in the sun."

The Egyptians have been accused of practising plumbing of carious teeth. This was believed till it was discovered that it was the Viennese mummy-dealers, who put gold in the teeth in order to make their merchandise more interesting and—more expensive! To fasten loose teeth the Egyptians used a compound of "incense, yellow ochre, malachite, well mixed and placed on the tooth"!

One of the oldest pictures of massage-treatment is found on an Assyrian alabaster carving from the reign of king Sanherib—he whose army was struck with the plague—on which, ca. 600 B.C., a man is seen bending over another in a reclining position, apparently administering an abdominal massage (Fig. 6).

*Mortui vivos docent*—it seems to me that a good deal of what we learn of the pathology of

our remote forebears conceivably may be of use to us, even though, of course, much of our knowledge necessarily is too vague to be compared with the results of the experimental sciences of our day and age.

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## Medical War Relief Fund

The following letter has been received by the Honorary-Treasurer:

"Dear Dr. Lewis,

Once again I have the pleasure of acknowledging receipt of a handsome cheque for the Medical War Relief Fund from our good friends in Canada. Your letter of February 10th arrived while the Distribution Subcommittee of the Fund was sitting and the Subcommittee expressed deep appreciation of the continued generosity of our Canadian colleagues.

The official receipt is enclosed. Please accept again our most grateful thanks.

Yours sincerely,

(Signed) G. C. ANDERSON  
Honorary-Treasurer"

March 14, 1942.

Additional subscriptions have been received from:—

Peterborough Medical Society .....	\$21.03
Victoria County Medical Society .....	10.00
District No. 2, Ontario Medical Association ....	750.00
Jewish General Hospital, Montreal .....	51.00
The London Convention Committee, Canadian Association of Radiologists .....	71.09

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## The War

### War Literature

#### BRITISH MEDICAL JOURNAL

Filtration of Plasma and Serum for Transfusion, R. G. MacFarlane, 1942, 1: 377.

#### CANADIAN PUBLIC HEALTH JOURNAL

Health, Nutrition and National Defence, T. F. Parran, 1942, 33: 99.  
Industrial Hygiene in Relation to Aviation, K. E. Dowd, 1942, 33: 105.

#### CANADIAN MEDICAL ASSOCIATION JOURNAL

Shock (No. II), P. G. Weil, 1942, 46: 417.

#### JOURNAL OF AVIATION MEDICINE

Some Limitations of the Electrocardiogram in the Physical Examination for Flying, C. E. Kossman, 1942, 13: 26.  
Effect on the Vital Capacity of a Swift Ascent to a Simulated Altitude of 35,000 Feet, M. Eckman and A. L. Barach, 1942, 13: 36.  
Corneal Transplantation; its Value to Aviation Medicine, R. A. Perritt, 1942, 13: 53.

## Program

### THE SEVENTY-THIRD ANNUAL MEETING

of the

## Canadian Medical Association

JASPER PARK, JUNE 15, 16, 17, 18, 19, 1942

Convention Headquarters—Jasper Park Lodge

<i>President</i>	-	-	-	DR. GORDON S. FAHRNI, Winnipeg
<i>President-Elect</i>	-	-	-	DR. A. E. ARCHER, Lamont
<i>General Secretary</i>	-	-	-	DR. T. C. ROUTLEY, Toronto

### GENERAL PROGRAM

Friday and Saturday, June 12th and 13th, Executive Committee Sessions

#### MONDAY, JUNE 15TH

- 9.00 a.m.—Registration.
- 9.30 a.m.—Meeting of General Council.
- 12.30 p.m.—Luncheon.
- 2.00 p.m.—Meeting of General Council.
- 6.00 p.m.—Meeting of Nominating Committee.
- 7.30 p.m.—Barbecue for members of General Council and their ladies as guests of the Alberta Division.
- 9.00 p.m.—Medical Secretaries' Conference.

#### TUESDAY, JUNE 16TH

- 9.00 a.m.—Registration.
- 9.30 a.m.—Meeting of General Council.
- All Day—Golf Tournament.
- 12.30 p.m.—Luncheon.
- 8.00 p.m.—Business Meeting of Alberta Division.
- 8.00 p.m.—Business Meeting of British Columbia Division.
- 8.30 p.m.—Business Meeting of Saskatchewan Division.

#### WEDNESDAY, JUNE 17TH

- 8.30 a.m.—Registration.
- 9.00 a.m.—Round-Table Conferences.
- 10.15 a.m.—General Session.
- 12.30 p.m.—Luncheon.
- 2.00 p.m.—Sectional Meetings.
- 3.45 p.m.—Annual Meeting Canadian Medical Protective Association.

#### Wednesday, June 17th—Continued

- 8.30 p.m.—Annual General Meeting, to which are invited all members and their ladies, guest speakers, official delegates and official guests. Informal dress.
- Presentation of medals and awards.
- Installation of President.
- Reception by the President and Mrs. Archer.
- 10.30 p.m.—Dance.

#### THURSDAY, JUNE 18TH

- 8.30 a.m.—Registration.
- 9.00 a.m.—Round-Table Conferences.
- 10.15 a.m.—General Session.
- 12.30 p.m.—Luncheon. To be followed by brief addresses from  
Brigadier R. M. Gorssline, D.G.M.S., R.C.A.M.C.  
Air Commodore R. W. Ryan, D.M.S., R.C.A.F.  
Surgeon Captain A. McCallum, S.M.O., N.S.H.Q.
- 2.00 p.m.—Sectional Meetings.
- 2.15 p.m.—Meeting of Incoming Executive Committee.
- 8.45 p.m.—Presentation of Golf Prizes.
- 9.00 p.m.—Medical Economics.  
Dr. Wallace Wilson, Chairman, Vancouver.  
Your Committee of Seven—its work, aims and responsibilities.  
Dr. T. H. Leggett, Ottawa.  
The relationship of the specialist and the consultant to the general practitioner and the public.  
Dr. J. H. MacDermot, Vancouver.  
Dr. F. S. Patch, Montreal.

**Federation of Medical Women of Canada**

Dr. Mildred Newell, Edmonton,  
President.

Dr. Katherine Ketchum, Toronto,  
Secretary.

Dr. Agnes Moffatt-Magee, Peter-  
borough, Treasurer.

7.45 a.m.—Breakfast.

Executive Meeting.

12.00 noon—Reception—Luncheon.

Annual Meeting.

Guest Speakers:

Dr. Edna Guest, O.B.E., National  
Chairman, War Services Com-  
mittee.

**Federation of Medical Women—Continued**

Dr. Lillian Chase, Vice-president,  
Saskatchewan.

Dr. Eleanor Percival, Convener,  
Maude Abbott Memorial  
Scholarship Fund.

FRIDAY, JUNE 19TH

8.30 a.m.—Registration.

9.00 a.m.—Round-Table Conferences.

10.15 a.m.—General Session.

12.30 p.m.—Luncheon.

2.00 p.m.—Sectional Meetings.

**SCIENTIFIC PROGRAM****ROUND-TABLE CONFERENCES**

WEDNESDAY MORNING, JUNE 17TH

**Anæsthesia**

Problems of respiration and anoxæmia.

Dr. D. C. Aikenhead (*Chairman*), Winnipeg

Dr. Digby Leigh, Montreal

Dr. E. H. Watts, Edmonton

**Dermatology**

Syphilis.

Dr. Donald H. Williams (*Chairman*),  
Vancouver

Dr. D. E. H. Cleveland, Vancouver

Dr. J. F. Burgess, Montreal

**Medicine**

The selection of sulfanilamide and related com-  
pounds in medical treatment.

Dr. Duncan Graham (*Chairman*), Toronto

Dr. H. K. Detweiler, Toronto

Dr. Irving Bell, Edmonton

**Obstetrics and Gynæcology**

Rational endocrine therapy in obstetrics and  
gynæcology.

Dr. Ross Mitchell (*Chairman*), Winnipeg

Dr. Allan Day, Edmonton

Dr. H. B. VanWyck, Toronto

Dr. J. D. McQueen, Winnipeg

**Pædiatrics**

Adolescent problems.

Dr. A. Howard Spohn (*Chairman*),  
Vancouver

Dr. U. J. Gareau, Regina

Dr. G. E. Swallow, Edmonton

**Radiology**

Radiotherapy of non-malignant diseases.

Dr. B. J. Harrison (*Chairman*), Vancouver

Wednesday Morning, June 17th—Continued

**Surgery**

Problems in bile tract surgery.

Dr. Roscoe R. Graham (*Chairman*),  
Toronto

Dr. P. H. T. Thorlakson, Winnipeg

Dr. M. A. R. Young, Lamont

Dr. F. I. Lewis, Toronto

THURSDAY MORNING, JUNE 18TH

**Joint Conference including all Sections**

The use and abuse of vitamins.

Dr. F. F. Tisdall (*Chairman*), Toronto

FRIDAY MORNING, JUNE 19TH

**Dermatology and Radiology**

Cutaneous cancer.

Dr. Harold Orr (*Chairman*), Edmonton

Dr. Norman Wrong, Toronto

Dr. B. R. Mooney, Winnipeg

**Medicine**

Recognition and treatment of poliomyelitis in  
general practice.

Dr. J. D. Adamson (*Chairman*), Winnipeg

Dr. O. J. Day, Winnipeg

Dr. F. H. Mewburn, Edmonton

**Obstetrics and Gynæcology**

The treatment of prolapse.

Dr. J. R. Vant (*Chairman*), Edmonton

Dr. T. R. Clarke, Edmonton

Dr. Edwin M. Robertson, Kingston

**Pædiatrics**

Pædiatric prevention of future foot disorders.

Dr. Graham Huckell (*Chairman*),  
Edmonton

Dr. R. P. Kinsman, Vancouver

Dr. R. G. Townsend, Calgary

**Friday Morning, June 19th—Continued****Radiology**

Presentation and discussion of interesting films.

Dr. W. H. McGuffin (*Chairman*), Calgary

**Surgery**

Principles and practice in wound treatment.

Dr. C. W. Burns (*Chairman*), Winnipeg

Dr. F. I. Lewis, Toronto

**Urology**

Urinary complications following rectal surgery.

Dr. Frank S. Patch (*Chairman*), Montreal

Dr. G. N. Ellis, Edmonton

Dr. W. F. Gillespie, Edmonton

Dr. H. H. Hepburn, Edmonton

**GENERAL SESSIONS**

WEDNESDAY MORNING, JUNE 17TH

History-taking

Dr. George S. Young, Toronto.

Amputations and after-care

Dr. H. K. MacDonald, Halifax.

The Presidential Address

Dr. Gordon S. Fahrni, Winnipeg.

The Osler Lecture

Dr. C. D. Parfitt, Toronto.

THURSDAY MORNING, JUNE 18TH

Industrial medicine

Dr. J. G. Cunningham, Toronto.

National health as a post-war problem

Dr. R. E. Wodehouse, Ottawa.

The treatment of psoriasis (illustrated with coloured motion pictures)

Dr. Paul O'Leary, Rochester, Minn.

Iodized oil in the diagnosis of non-tuberculous pulmonary diseases by means of bronchography.

Dr. Carleton B. Peirce, Montreal.

FRIDAY MORNING, JUNE 19TH

Essential features concerning the proper nutrition of the infant and child

Dr. Alan Brown, Toronto.

The treatment of head injuries in war

Dr. W. G. Penfield, and

Dr. William Cone, Montreal.

Common eye diseases, diagnosis and treatment (illustrated by kodachrome slides)

Dr. Lloyd Morgan, Toronto.

Radiological interpretation in gynaecology

Dr. Léon Gérin-Lajoie, Montreal.

**SECTIONAL MEETINGS****Section of Anaesthesia**

WEDNESDAY AFTERNOON, JUNE 17TH

Intravenous anaesthesia

Dr. S. W. Johns, Calgary.

Mortality and morbidity following surgery in a large general hospital

Dr. D. C. Aikenhead, Winnipeg.

Oxygen therapy and resuscitation

Dr. Digby Leigh, Montreal.

Continuous spinal anaesthesia

Dr. E. H. Watts, Edmonton.

**Section of Dermatology**

WEDNESDAY AFTERNOON, JUNE 17TH

Lupus erythematosus

Dr. A. G. Duncan, Calgary.

Sarcoidosis; systemic and cutaneous manifestations

Dr. G. S. Williamson, Ottawa.

Dermatoscleroses (illustrated with coloured motion pictures).

Dr. Paul O'Leary, Rochester, Minn.

Ointment bases

Dr. L. P. Ereaux, Montreal.

**Section of Dermatology—Continued**

FRIDAY AFTERNOON, JUNE 19TH

Recurring vesicular eruptions on the hands

Dr. Arthur R. Birt, Winnipeg.

The weather and the patient's skin

Dr. Norman Wrong, Toronto.

Vitamins in dermatology

Dr. J. F. Burgess, Montreal.

The rôle of the medical profession in venereal disease control in British Columbia

Dr. Donald H. Williams, Vancouver.

**Section of Historical Medicine**

THURSDAY AFTERNOON, JUNE 18TH

The social history of medicine—a commentary on newer trends

Dr. M. M. Cantor, Edmonton.

William Smellie

Dr. Ross Mitchell, Winnipeg.

The medical sources of Dr. Jekyll and Mr. Hyde

Dr. E. P. Scarlett, Calgary.

**Section of Historical Medicine—Continued**

FRIDAY AFTERNOON, JUNE 19TH

Dr. Michael Clark

Dr. G. D. Stanley, Calgary.

Jerome Cardan

Dr. H. E. MacDermot, Montreal.

Baron Larrey—Surgeon General to the Army  
of Napoleon

Dr. A. R. Munroe, Edmonton.

The trails of the early doctors in the central  
prairies

Dr. J. A. Valens, Saskatoon.

**Section of Medicine**

WEDNESDAY AFTERNOON, JUNE 17TH

The recognition and management of the early  
apical lesion

Dr. A. H. Baker, Calgary.

Silicosis

Dr. E. P. Scarlett, Calgary.

Facts on rheumatoid arthritis

Dr. L. DeWitt Wilcox, London.

Vocational guidance, occupational adjustment  
and medicine

Dr. Donat Voghel, Montreal.

THURSDAY AFTERNOON, JUNE 18TH

Some common functional diseases of the  
intestines and their management

Dr. P. H. Sprague, Edmonton.

Edema

Dr. George C. Hale, London.

Bromide intoxication

Dr. H. K. Detweiler, Toronto.

FRIDAY AFTERNOON, JUNE 19TH

Some obscure pains in the chest, back or limbs

Dr. Gerard Allison, Winnipeg.

Cardiac pain

Dr. G. F. Strong, Vancouver.

The interpretation of faint heart sounds

Dr. Harold N. Segall, Montreal.

Climatic factors in health and disease

Dr. J. W. Scott, Edmonton.

**Section of Military Medicine**

THURSDAY AFTERNOON, JUNE 18TH

Inspection and treatment of soldiers' feet

Captain O. Rostrup, R.C.A.M.C.

Experiences in medical selection of air crew

W/C. F. A. L. Mathewson, R.C.A.F.

Infectious diseases in the Army

Lt.-Colonel A. C. Rankin, C.M.G.,  
R.C.A.M.C.

Discussion Period—

in which Brigadier R. M. Gorssline,  
Air Commodore R. W. Ryan and  
Surgeon Captain A. McCallum

will take part.

**Section of Obstetrics and Gynæcology**

THURSDAY AFTERNOON, JUNE 18TH

Sterility in the female

Dr. J. E. Harrison, Vancouver.

The management of the third stage

Dr. W. S. Holmes, Saskatoon.

Breech presentation

Dr. Arthur Nash, Victoria.

FRIDAY AFTERNOON, JUNE 19TH

The treatment of fibroids of the uterus

Dr. J. D. McQueen, Winnipeg.

Vaginal discharge; diagnosis and treatment

Dr. Edwin M. Robertson, Kingston.

Antepartum hæmorrhage

Dr. H. B. VanWyck, Toronto.

A five year summary of maternal deaths in  
Alberta

Dr. J. R. Vant, Edmonton.

**Section of Ophthalmology**

FRIDAY AFTERNOON, JUNE 19TH

Difficulties and complications in the senile  
cataract operation

Dr. R. J. P. McCulloch, Toronto.

One of the phases of plastic surgery of the  
eyelids

Dr. Fulton Risdon, Toronto.

Vertical phorias, operative and non-operative

Dr. Charles E. Davies, Vancouver.

**Section of Otolaryngology**

WEDNESDAY AFTERNOON, JUNE 17TH

Surgery of the mastoid

Dr. Joseph A. Sullivan, Toronto.

Headache of nasal origin

Dr. G. Edward Tremble, Montreal.

The sinus problem

Dr. Keith Hutchison, Montreal.

Recent advances in medical therapy in diseases of the ear, nose and throat

Dr. F. D. McKenty, Winnipeg.

Sudden deafness

Dr. A. L. Yates, Calgary.

**Section of Pædiatrics**

THURSDAY AFTERNOON, JUNE 18TH

Anorexia of childhood

Dr. G. E. Swallow, Edmonton.

Second year anæmias

Dr. A. E. M. Cairns, Lethbridge.

Allergic problems

Dr. Gordon Chown, Winnipeg.

Prevention of bullous impetigo in hospital nurseries

Dr. R. P. Kinsman, Vancouver.

FRIDAY AFTERNOON, JUNE 19TH

Convulsions

Dr. H. W. Price, Calgary.

Meningitis in childhood

Dr. Nelles Silverthorne, Toronto.

Progress in poliomyelitis

Dr. O. J. Day, Winnipeg.

Clinical study of western variety encephalitis occurring in young infants

Dr. Harry Medovy, Winnipeg.

**Section of Radiology**

WEDNESDAY AFTERNOON, JUNE 17TH

Luetic disease of the bone

Dr. S. M. Rose, Lethbridge.

Primary tumours of the bone

Dr. M. C. Morrison, London.

Inherent filtration of x-ray tubes

Mr. Dale Trout, Chicago.

THURSDAY AFTERNOON, JUNE 18TH

An analysis of carcinoma of the colon, commenting on the accuracy of radiological diagnosis

Dr. M. M. R. Hall, Toronto.

Remarks on the nature of cancer

Dr. B. J. Harrison, Vancouver.

Tomographic studies of the thoracic viscera

Dr. Carleton B. Peirce, Montreal.

**Section of Surgery**

WEDNESDAY AFTERNOON, JUNE 17TH

Surgical principles in compound fractures

Dr. R. G. Townsend, Calgary.

The management of un-united fractures of the neck of the femur

Dr. F. I. Lewis, Toronto.

Surgical care of poliomyelitis

Dr. F. H. H. Mewburn, Edmonton.

Spondylolisthesis

Dr. R. I. Harris, Toronto.

THURSDAY AFTERNOON, JUNE 18TH

Failures in inguinal hernia

Dr. R. L. Anderson, Edmonton.

Present status of duodenal ulcer surgery

Dr. M. A. R. Young, Lamont.

The early diagnosis of cancer

Dr. M. R. MacCharles, Winnipeg.

Surgical problems of the navy

Surgeon Lieutenant Commander Walter C. MacKenzie, R.C.N.V.R., St. John's, Nfld.

FRIDAY AFTERNOON, JUNE 19TH

Indications for thyroidectomy in the presence of a normal basal metabolic rate

Dr. J. K. Fife, Edmonton.

The clinical application of present-day methods in treatment of shock

Dr. H. V. Morgan, Calgary.

Physiological problems in intestinal obstruction

Dr. Norman B. Taylor, Toronto.

The surgical treatment of congenital hydrocephalus

Dr. H. H. Hepburn, Edmonton.

**Section of Urology**

WEDNESDAY AFTERNOON, JUNE 17TH

Retroperitoneal tumours in children

Dr. Frederick Pilcher, Calgary.

Strictures of the ureter

Dr. H. D. Morse, and

Dr. C. B. Stewart, Winnipeg.

On carcinoma of the prostate

Dr. Frank S. Patch, Montreal.

FRIDAY AFTERNOON, JUNE 19TH

Treatment of urinary infections

Dr. A. W. Hunter, Vancouver.

Management of vesical neck obstruction

Dr. N. E. Berry, Kingston.

Further results in uretero-intestinal anastomosis

Dr. R. A. McComb, and

Dr. Robin Pearse, Toronto.

Renal tuberculosis, presentation of two interesting cases

Dr. Gordon Ellis, Edmonton.

**LADIES' PROGRAM****SATURDAY, JUNE 13TH**

4.00 p.m.—Tea at AA Cottage, for the wives and daughters of members of the Executive Committee.

Hostess—Mrs. A. E. Archer.

6.30 - 8.00 p.m.—An out-door steak dinner at Lake Annette.

**MONDAY, JUNE 15TH**

Golf, Hikes, Boating, Swimming, Tennis, Horseback riding, Bridge on request.

6.30 - 8.00 p.m.—Buffalo Barbecue at Lake Annette where Members of General Council and Ladies will be guests of the Alberta Division.

8.30 - 11.00 p.m.—Motion Pictures and Dancing in the Ball Room.

**TUESDAY, JUNE 16TH**

a.m. Registration.

Golf, Hikes, Boating, Swimming, Tennis, Horseback riding, Bridge on request.

(It has been arranged that all members of the Canadian Medical Association quartered outside the Lodge, may share in all sports and facilities of the Lodge, at the same rates as resident guests.)

All guests wishing to play tennis are requested to bring racquets. Balls may be bought at the Lodge.

**WEDNESDAY, JUNE 17TH**

a.m. Registration.

Ladies' Golf Tournament.

Tennis, Riding, Fishing, Hiking, Boating, Swimming.

p.m. Drives to nearby points of interest.

8.30 p.m.—Ceremonial Installation of the President of the Canadian Medical Association.

Awards and Prizes.

10.00 p.m.—Reception and Dance (dress informal).

**THURSDAY, JUNE 18TH**

a.m. Golf, Tennis, Swimming, Hiking, Riding, Fishing and Boating.

p.m. The members of the Canadian Medical Association and their Ladies will be entertained at a Garden Party by the President and Mrs. A. E. Archer.

**Thursday, June 18th—Continued**

Evening Motion Pictures.

Dancing.

Bridge.

**FRIDAY, JUNE 19TH**

a.m. Putting and Pitching Competition at Golf Course.

1.00 p.m.—Coffee Party at Club House.

Awarding of golf prizes.

Drives to nearby points of interest, as may be arranged.

**YOUNG PEOPLE'S PROGRAM**

There has been no formal program arranged for young people but the Social Committee will gladly arrange for a share in all sports mentioned in other programs; and, in addition, attractive horseback rides including hot breakfast out of doors.

At a nominal fee, tennis, canoeing, swimming in warm pool are available, and it is a lovely place for hikes and sight seeing.

**Ladies' Convention Committees***Chairman*

MRS. A. E. ARCHER

*Vice-Chairman*

MRS. J. R. VANT

*Secretary*

MRS. CREIGHTON DOBSON

**Registration and Information**

MRS. J. O. BAKER (*Convener*)

MRS. J. J. OWER

MRS. P. H. SPRAGUE

MRS. H. H. HEPBURN

MRS. G. R. DAVISON

**Transportation**

MRS. T. H. FIELD (*Convener*)

**Publicity**

MRS. GORDON SWALLOW (*Convener*)

MRS. M. A. R. YOUNG

MRS. A. C. MCGUGAN

**Social**

MRS. FULTON GILLESPIE (*Convener*)

MRS. ALLAN DAY

MRS. JOHN MACGREGOR

MRS. GRAHAM HUCKELL

MRS. HASTINGS MEWBURN

MRS. H. H. HEPBURN

MRS. HAROLD ORR

MRS. MARK LEVEY

MRS. E. H. WATTS

MRS. D. B. LEITCH

MRS. LESLIE WILLIAMSON

**Finance**

MRS. W. A. SCANLON (*Convener*)

MRS. A. F. ANDERSON

**Additional Hostesses**

MRS. J. A. VALENS, Saskatoon.

MRS. GEO. R. JOHNSON, Calgary.

MRS. R. B. FRANCIS, Calgary.

MRS. J. A. ALTON, Lamont.

MRS. C. F. CONNOLLY, Andrew.

**GOLF TOURNAMENT DAY**

Tuesday, June 16th,—All Day

Golfers, fore! Tuesday is the day. Make up your own foursome or hand your name in at the Registration Desk, and you will be placed in a foursome.

Tee off any time after 9.00 a.m. Starting times may be arranged at the first Tee. Each player, before teeing off, must register his name, Province and handicap. Score cards must be signed and handed in on completion of round.

There are two beautiful cups for competition: first, the Ontario Cup, presented by the Canadian Medical Association, Ontario Division, open to members of the Canadian Medical Association, awarded to the lowest net individual score. Second,—the Alberta Cup, presented by the Canadian Medical Association, Alberta Division. This is a new cup this year and is to be played for under the following rules:

1. The trophy is to be competed for annually at the Canadian Medical Association meeting.
2. Contestants shall be teams of six players representing each Province of the Dominion.
3. Players must reside in the Province which they represent and must be members of the Canadian Medical Association.
4. Personnel of the teams shall consist of the six lowest net scorers on the day of the tournament.
5. Only one team shall be allowed to represent each Province.
6. Each player will use his lowest Club handicap.
7. Maximum handicap allowed to be 24.
8. The team with the lowest net score shall be the winners.
9. Winners of the Cup shall be responsible for bringing it to the next Canadian Medical Association Annual Meeting.
10. The Society represented by the winning team shall be responsible for the engraving of the shield.
11. At the end of ten years, the cup shall be returned to the Canadian Medical Association, Alberta Division.

**DRESS — INFORMAL**

All functions of the convention are to be strictly informal. You do not need to bring evening dress or dinner jackets.

**CANADIAN MEDICAL ASSOCIATION,  
SASKATCHEWAN DIVISION****College of Physicians and Surgeons  
of Saskatchewan**

The Annual General Meeting of the College of Physicians and Surgeons of Saskatchewan, Canadian Medical Association — Saskatchewan Division, will be held on Tuesday, June 16, 1942, at Jasper Park Lodge, Jasper, Alberta, beginning at 8.30 p.m.

A Golf Tournament will be held Tuesday afternoon. There are several Saskatchewan Cups to be played for. Dr. E. T. French, of Regina, is the Chairman of the Golf Committee.

We urge as many of our members as possible to be present at our Annual General Meeting on Tuesday evening and remain at Jasper for the Canadian Medical Association scientific sessions to be held on Wednesday, Thursday and Friday.

*President*—Dr. J. A. Valens,

*First Vice-president*—Dr. A. C. Scott,

*Second Vice-president*—Dr. M. H. McDonald,

*Registrar*—Dr. A. W. Argue.

**CANADIAN MEDICAL ASSOCIATION,  
BRITISH COLUMBIA DIVISION**

*President*—Dr. C. H. Hankinson, Prince Rupert.

*First Vice-president*—Dr. A. H. Spohn, Vancouver.

*Second Vice-president*—Dr. P. A. C. Cousland, Victoria.

*Honorary Secretary-Treasurer*—Dr. A. Y. McNair, Vancouver.

*Immediate Past President*—Dr. Murray Blair, Vancouver.

TUESDAY, JUNE 16TH

Afternoon—Golf.

8.00 p.m.—Meeting of whole membership of the College of Physicians and Surgeons of British Columbia, followed by Meeting of British Columbia Medical Association, (Canadian Medical Association British Columbia Division).

PLEASE NOTE: All members of the British Columbia Division are urged to attend the session on Medical Economics of the C.M.A. on Thursday evening, June 18th, at nine o'clock.

## *The General Secretary's Page*

Many older members will recall how difficult it was, not so many years ago, to get a quorum together at an annual meeting to conduct Association business. Nobody seemed to be interested—at least, nobody excepting a few faithful members who believed in the Association and its future. And between Annual Meetings very little business was transacted.

But what a change has occurred in the last two decades. If Sir Charles Tupper, Murdoch Chisholm, George Bingham, I. H. Cameron, A. D. Blackader, John Stewart and R. W. Powell, and a host of others, could look in on us now, how happy they would be to see the Association alive and functioning, not for three days but for three hundred and sixty-five days in the year.

General Council, the Parliament of the Association, meets for the first two days of the Annual Meeting. Delegates representing every Province in the Dominion will foregather at Jasper Park on Monday and Tuesday, June 15th and 16th, not to receive or discuss scientific papers, but to receive and discuss a score of reports representing the year's work of a large number of Committee members.

The Executive Committee which represents General Council between annual meetings, devotes seven days in four sessions to the consideration of Association business.

Each one of the several standing and special committees is doing a splendid piece of work—not for its own glorification—but in order that medicine in Canada may best fulfill its destiny.

The question has been asked, "Are these Committees paid?" The answer is decidedly "No". On the contrary the members sacrifice much time and money in order that you, their fellow members, may be served.

In March, we sent our second Questionnaire for war purposes to more than 10,000 doctors. Why did we do it? Because the survey of 1939 was out of date and the authorities at Ottawa believed that a useful purpose would be served in again asking the profession to indicate their wishes in respect to war service. Approximately 4,500 replies have been received. The Records Department of the Federal Government has kindly undertaken to code and tabulate the returns. The need for doctors in the three fighting Services is still great, but we are advised that medical enlistments have been accelerated since the Questionnaire was issued. That is as it should be, but there is room for many more. If you are interested in enlisting, see your D.M.O. and talk the matter over.

On a number of occasions we have been asked, "What happened to the request of the B.M.A. for Doctors for Britain?" Here are the facts:

They were to be unmarried and under thirty.

They were to sign up for the duration of the war.

As officers in the British Army, they would receive less pay and allowances and be subject to higher income tax than was applicable in the Canadian forces.

Under exchange regulations they could not send money back to Canada.

For the above reasons, the response to the invitations issued by the several Divisions to those who were eligible was almost negligible. Subsequently, we proposed that the British and Canadian Governments should endeavour to iron out the problem. We recommended that the required number of doctors be enlisted in the R.C.A.M.C. and seconded to the R.A.M.C., thus eliminating the difficulties. In April, 1941, an agreement was reached between the two Governments whereby officers in the R.C.A.M.C. would be loaned to the R.A.M.C., but (and this is very important) in respect to pay, allowances, etc., the officers so loaned are on the strength of Canada's Army. Since that date, the matter has been in the hands of the military authorities in Ottawa, who inform us that 83 Canadian Doctors have been loaned to Britain.

From several parts of Canada, doctors have written to complain about their gasoline ration. They were under the impression that they would be placed in Category C (approximately 15,000 miles) irrespective of their estimated mileage for 1942 as stated on the application form. But this did not prove to be the case. The Oil Controller in each instance issued a coupon book according to the doctor's expressed requirements. If you underestimated your mileage and run short, you will find your regional oil controller ready to give consideration to your problem, but remember this—the gasoline situation grows worse each day and supplies must be conserved as far as possible. I have assured the Oil Controller that he may confidently count on the whole-hearted co-operation of Canada's doctors in respect to this problem.

And a word about tires:—the rubber situation is desperate and is growing worse. Everybody, and that includes the medical profession, may find it very difficult to get tires before the war is over; so take the best possible care of yours.

**AMENDMENTS TO CONSTITUTION AND BY-LAWS PROPOSED BY THE COMMITTEE  
ON CONSTITUTION AND BY-LAWS IN ACCORDANCE WITH ARTICLE XIII,  
PARAGRAPH 2, OF THE CONSTITUTION, AND CHAPTER XII,  
PARAGRAPH 2, OF BY-LAWS.**

The progressive revision and consolidation of the By-Laws which has been in progress for the last five years, is now nearly completed. The final changes prior to publication are included in this revision.

**PRESENT CONSOLIDATED CONSTITUTION**

**ARTICLE I.—TITLE**

This Association shall be known as The Canadian Medical Association, and when the French language is used, it shall be known as "L'Association Médicale Canadienne".

**ARTICLE II.—OBJECTS**

1. The promotion of health and the prevention of disease.
2. The improvement of medical services however rendered.
3. The maintenance of the integrity and honour of the medical profession.
4. The performance of such other lawful things as are incidental or conducive to the welfare of the public and of the medical and allied professions.

**ARTICLE III.—ETHICS**

The Code of Ethics of The Association (see Appendix) shall be such as may be adopted by The Association from time to time. A copy shall be supplied to each member of The Association.

**ARTICLE IV.—MEMBERSHIP**

The Association shall be composed of ordinary members, members-at-large, senior, non-resident and honorary members, elected by the method set forth in the By-Laws.

**ARTICLE V.—BRANCH ASSOCIATIONS AND DIVISIONS**

Each Provincial Medical Association, or the body representing organized medicine in a Province and enjoying all the rights and privileges of a medical association, may be recognized as a Branch Association, but any Branch Association, if it so desire, may change its relationship to The Canadian Medical Association and become a Division by the method set forth in the By-Laws. It shall then be known as The Canadian Medical Association (name of Province) Division.

**ARTICLE VI.—AFFILIATED SOCIETIES**

Any nationally or internationally organized medical, scientific, or sociological body may, subject to the approval of the General Council, become affiliated with The Canadian Medical Association. Affiliation shall be understood to imply the establishment of a friendly relationship with the affiliated organization. There shall be no obligation on the part of either party to the affiliation to sponsor policies or movements on the part of the other.

**ARTICLE VII.—MEETINGS**

The meetings of The Association shall be held in whole or in part on such occasions as may be provided for in the By-Laws.

**PROPOSED CONSTITUTION**

**ARTICLE I.—TITLE**

(Unchanged)

**ARTICLE II.—OBJECTS**

(Unchanged)

**ARTICLE III.—ETHICS**

(Unchanged)

**ARTICLE IV.—MEMBERSHIP**

(Unchanged)

**ARTICLE V.—DIVISIONS**

Each Provincial Medical Association (or the body representing organized medicine in a Province and enjoying all the right and privileges of a medical association) may become a Division of the Canadian Medical Association by the method set forth in the By-Laws. It shall then be known as The Canadian Medical Association (name of Province) Division.

**ARTICLE VI.—AFFILIATED SOCIETIES**

(Unchanged)

**ARTICLE VII.—MEETINGS**

(Unchanged)

**PRESENT CONSOLIDATED CONSTITUTION****ARTICLE VIII.—OFFICERS**

- (a) The Patron.
- (b) The elective officers of The Association shall be a President, a President-Elect, a Chairman of the General Council, and an Honorary-Treasurer.
- (c) The appointive officers of The Association shall be a General Secretary and such other officers as may be appointed by the Executive Committee. The appointive officers shall have no voting power.

**ARTICLE IX.—THE GENERAL COUNCIL**

The General Council shall consist of:

- (a) The Officers of The Association.
- (b) The President and Secretary or Joint Secretaries of each Branch Association or Division.
- (c) Delegates elected by Branch Associations and Divisions, amongst whom shall be included the members designated by Divisions for the Nominating Committee and the Executive Committee.
- Each Branch Association or Division shall be entitled to elect five delegates to serve on the General Council for its membership in The Canadian Medical Association of fifty or less; one additional delegate for its membership from fifty-one to one hundred; one additional delegate for its membership from 101 to 300; and thereafter one delegate for every 300 above 300. One of its representatives on General Council may be named by a Division as its nominee to the Nominating Committee of The Association.
- (d) The Chairmen of the Standing Committees of The Association.
- (e) Past-Presidents of The Association.
- (f) Two representatives of the Department of Pensions and National Health, who are members of The Canadian Medical Association, one of whom shall be the Deputy Minister of Pensions and National Health.

**ARTICLE X.—COMMITTEES**

The Committees shall be:

- (a) Standing.
- (b) Special.
- (a) The Executive Committee shall be elected by the General Council; the other standing committees shall be appointed by the Executive Committee.
- The standing committees are as follows:
1. The Executive Committee.
  2. The Committee on Legislation.
  3. The Committee on Medical Education.
  4. The Post-Graduate Committee.
  5. The Central Program Committee.
  6. The Committee on Constitution and By-Laws.
  7. The Committee on Archives.
  8. The Committee on Public Health.
  9. The Committee on Ethics and Credentials.
  10. The Committee on Economics.
  11. The Committee on Pharmacy.
  12. The Committee on Hospital Service.
  13. The Cancer Committee.
  14. The Committee on Maternal Welfare.
  15. The Committee on Nutrition.
- (b) Special Committees may be appointed by—
- (i) The President.
  - (ii) The General Council.
  - (iii) The Executive Committee.
  - (iv) The Chairman of the General Council.

**ARTICLE XI.—FUNDS**

Funds for the purpose of The Association shall be raised in such manner as may be determined by the General Council.

**ARTICLE XII.—THE ASSOCIATION YEAR**

The Association year shall be the calendar year.

**PROPOSED CONSTITUTION****ARTICLE VIII.—OFFICERS**

(Unchanged)

**ARTICLE IX.—THE GENERAL COUNCIL**

- (a) (Unchanged).
- (b) The President and Secretary or Joint Secretaries of each Division.
- (c) Delegates elected by Divisions amongst whom shall be included the members designated by Divisions for the Nominating Committee and the Executive Committee.

Each Division shall be entitled to elect five delegates to serve on the General Council for its membership in The Canadian Medical Association of fifty or less; one additional delegate for its membership from fifty-one to one hundred; one additional delegate for its membership from 101 to 300; and thereafter one delegate for every 300 above 300. One of its representatives on General Council may be named by a Division as its nominee to the Nominating Committee of The Association.

(d) (Unchanged).

(e) (Unchanged).

(f) (Unchanged).

**ARTICLE X.—COMMITTEES**

(Unchanged).

(a) (Unchanged).

(1 to 15 unchanged)

16. Committee on Industrial Medicine.
17. Committee on Membership.

- (b) (Unchanged).
- (i) (Unchanged).
  - (ii) (Unchanged).
  - (iii) (Unchanged).
  - (iv) (Unchanged).

**ARTICLE XI.—FUNDS**

(Unchanged)

**ARTICLE XII.—THE ASSOCIATION YEAR**

(Unchanged)

**PRESENT CONSOLIDATED CONSTITUTION****ARTICLE XIII.—AMENDMENTS**

1. Notice of motion by one or more members to amend the Constitution must be placed in the hands of the General Secretary six months before the date of the annual meeting.

2. Amendments may be proposed by the General Council, the Executive Committee, or the Committee on Constitution and By-Laws without notice of motion, but the proposed amendments shall be published in the *Journal* in two issues preceding the annual meeting.

3. The Constitution shall be amended by a two-thirds vote of the members of the General Council in session present and voting.

**ARTICLE XIV.—PROVINCIAL AUTONOMY**

No provision of the Constitution or By-Laws herein set forth shall interfere with the status of a Branch Association or Division as a Provincial organization. As a Provincial body it shall have complete control of its own affairs. In the case of a Division, if it choose, it may retain its present name, as well as being known as Canadian Medical Association (name of Province) Division.

**BY-LAWS****CHAPTER I.—DIVISIONS**

A Branch Association may become a Division as outlined in Article V of the Constitution and enjoy all the rights and privileges of a Division in the following manner:

1. By intimating to The Canadian Medical Association in writing that it desires to become a Division.

2. By agreeing to amend, where necessary, its Constitution and By-Laws to place them in harmony with the Constitution and By-Laws of this Association.

3. By agreeing to collect from all of its Divisional Members who desire to be members of The Canadian Medical Association such annual fee as may from time to time be set for membership and remit same to this Association.

4. By agreeing to take such steps as seem proper to the Division to increase membership in The Association.

**CHAPTER II.—MEMBERSHIP****Section 1—Ordinary Members**

Every member in good standing in a Branch Association or a Division shall be automatically an ordinary member of The Canadian Medical Association on payment of the annual fee as levied by the General Council.

**Section 2—Members-at-Large**

Any graduate in medicine residing in Canada who is not a member of a Branch Association or of a Division may be accepted as a member of The Canadian Medical Association provided that, with his application, a certificate of approval from the executive body of the Branch Association or Division in the Province in which the applicant resides be furnished to the General Secretary. In the case of an applicant residing in Canada in a territory beyond the jurisdiction of a Branch Association or of a Division, the application must be endorsed by two members of The Canadian Medical Association. Such members shall be designated "Members-at-Large" and shall pay the annual fee as levied by the General Council.

**PROPOSED CONSTITUTION****ARTICLE XIII.—AMENDMENTS**

1. (Unchanged).

2. (Unchanged).

3. (Unchanged).

**ARTICLE XIV.—PROVINCIAL AUTONOMY**

No provision of the Constitution or By-Laws herein set forth shall interfere with the status of a Division as a Provincial organization. As a Provincial body it shall have complete control of its own affairs. A Division, if it choose, may retain its present name as well as being known as Canadian Medical Association (name of Province) Division.

**BY-LAWS****CHAPTER I.—DIVISIONS**

A Provincial Medical Association (or the body representing organized medicine in a Province and enjoying all the rights and privileges of a medical association) may become a Division as outlined in Article V of the Constitution and enjoy all the rights and privileges of a Division in the following manner:

1. (Unchanged).

2. (Unchanged).

3. By agreeing to collect from those of its members who desire to be members of The Canadian Medical Association such annual fee as may from time to time be set for membership and remit same to this Association.

4. (Unchanged).

**CHAPTER II.—MEMBERSHIP****Section 1—Ordinary Members**

Every member in good standing in a Division shall be automatically an ordinary member of The Canadian Medical Association on payment of the annual fee as levied by the General Council.

**Section 2—Members-at-Large**

Any graduate in medicine residing in Canada, or any teacher of the ancillary sciences in a school of medicine in Canada (not a graduate in medicine), who is not a member of a Division may be accepted as a member of The Canadian Medical Association provided that, with his application, a certificate of approval from the executive body of the Division in the Province in which the applicant resides be furnished to the General Secretary. In the case of an applicant residing in Canada in a territory beyond the jurisdiction of a Division, the application must be endorsed by two members of The Canadian Medical Association. Such members shall be designated "Members-at-Large" and shall pay the annual fee as levied by the General Council.

**PRESENT CONSOLIDATED CONSTITUTION***Section 3—Senior Members*

Any member of The Association in good standing for the immediately preceding ten-year period who has attained the age of seventy years is eligible to be nominated for senior membership by an ordinary member of The Association. He may be elected only by the unanimous approval of the members of the Executive Committee in session present and voting. Not more than ten such senior members may be elected in any one year. Senior members shall enjoy all the rights and privileges of The Association but shall not be required to pay any annual fee.

*Section 4—Non-Resident Members*

Non-resident members may be elected by the Executive Committee from regularly qualified practitioners residing outside of Canada. They shall be required to pay not more than seventy-five per cent of the annual fee as levied by General Council.

*Section 5—Honorary Members*

Honorary members may be nominated by any member of The Association and shall be elected only by a unanimous vote of the Executive Committee or the General Council in session present and voting. Not more than five honorary members may be elected in any one year and at no time shall the list of living honorary members exceed twenty-five. Honorary members shall enjoy all the rights and privileges of The Association but shall not be required to pay any annual fee.

*Section 6—Discipline of Members*

Any member failing to conform to the Constitution and By-Laws and/or Code of Ethics (see Appendix) shall be liable to censure, suspension or expulsion.

(a) Any member whose annual fee is directly payable to The Canadian Medical Association and whose annual fee has not been paid on or before the 31st day of March of the current year, may, without prejudice to his liability to The Association, be suspended from all privileges of membership.

(b) Any member who has been found guilty of unprofessional conduct may, upon representation of the facts to the General Council, be censured, suspended or expelled from The Canadian Medical Association.

*Section 7—Restoration to Membership*

A member, suspended or expelled, shall not be restored to membership until all arrears of fees (if directly payable to The Canadian Medical Association) have been paid, or until such requirements as may be determined by the General Council or the Executive Committee have been met.

*Section 8—Resignation from Membership*

Membership in The Association shall automatically cease only on suspension, expulsion or death. Resignation may be effected (1) in the case of a member of a Division by giving notice to the Secretary of the Division not less than one month before the beginning of the calendar year; (2) in the case of a member of a Branch Association or in the case of a member-at-large by giving notice directly to the General Secretary of The Canadian Medical Association one month before the next annual fee is due.

*Section 9—Registration at Meetings*

No member shall take part in the proceedings of The Canadian Medical Association or in the proceedings of any of the Sections thereof or attend any part of the meeting until he has properly registered. Only members and invited guests are eligible to register and attend an annual meeting.

**PROPOSED CONSTITUTION***Section 3—Senior Members*

(Unchanged)

*Section 4—Non-Resident Members*

(Unchanged)

*Section 5—Honorary Members*

(Unchanged)

*Section 6—Discipline of Members*

(Unchanged)

(Unchanged)

(Unchanged)

*Section 7—Restoration to Membership*

(Unchanged)

*Section 8—Resignation from Membership*

Membership in The Association shall automatically cease only on suspension, expulsion or death. Resignation may be effected (1) in the case of a member of a Division by giving notice to the Secretary of the Division not less than one month before the beginning of the calendar year; (2) in the case of a member-at-large by giving notice directly to the General Secretary of The Canadian Medical Association one month before the next annual fee is due.

*Section 9—Registration at Meetings*

(Unchanged)

**PRESENT CONSOLIDATED CONSTITUTION****CHAPTER III.—GUESTS AND VISITORS****Section 1—Visitors from outside of Canada**

Medical practitioners and other men of science residing outside of Canada may attend the annual meeting as guests of the President or of the General Council, or as visitors when vouched for by the General Secretary. They shall register with the General Secretary without payment of fee and may, after proper introduction, be allowed to participate in discussions.

**Section 2—Medical Students attending Meetings**

Any hospital intern or medical student, when properly vouched for, may be admitted as a guest to the scientific meetings but shall not be allowed to take part in any of the proceedings unless specially invited by the Committee on Program to present a communication.

**Section 3—Delegates from Affiliated Societies at Scientific Meetings**

Two delegates from each affiliated society, one only of whom is required to be a member of this Association, may attend the scientific meetings.

**Section 4—Delegates from Affiliated Societies at Meetings of General Council**

Two delegates from each affiliated society, provided one delegate is a member of this Association, may be invited by the Executive Committee to attend meetings of the General Council. They may, at the request of the Chairman, take part in the deliberations but shall have no voting power.

**CHAPTER IV.—ANNUAL MEETINGS****Section 1—Time and Place of Meetings**

The time and place of meetings shall be decided by the General Council or the Executive Committee, and shall be announced as early as possible.

**Section 2—Arrangements for Annual Meetings**

When the Canadian Medical Association meets in any Province where there is a Branch Association or Division, the meeting of that Branch Association or Division for that year shall be for business purposes only. The local arrangements shall be under the direction of the Executive Committee of the Canadian Medical Association, which may enlist the assistance of the Branch Association or Division or one of its component societies. The Canadian Medical Association assumes full control of the proceedings of the meeting and of all financial obligations save entertainment.

**Section 3—Type of Program**

The program of the meeting may consist of business sessions, general and sectional scientific sessions, and any other sessions which may be decided upon by the Executive Committee.

**Section 4—Presiding Officer**

The President or some person designated by him shall preside at all general meetings.

**Section 5—Rules of Order**

The Rules of Order which govern the proceedings of the House of Commons of Canada shall be the guide for conducting all meetings of The Association.

**CHAPTER V.—MEETINGS OF SECTIONS****Section 1—Sectional Scientific Sessions**

The Executive Committee shall determine what scientific sections shall hold sessions at any annual meeting.

**Section 2—Appointment of Sectional Officers**

The Chairman and Secretary for each scientific Section shall be appointed by the Executive Committee.

**Section 3—Presiding Officers at Meetings of Sections**

The Chairman of the Section, or some one designated by him, shall preside at all meetings of the Section.

**PROPOSED CONSTITUTION****CHAPTER III.—GUESTS AND VISITORS****Section 1—Visitors from outside of Canada**

(Unchanged)

**Section 2—Medical Students attending Meetings**

(Unchanged)

**Section 3—Delegates from Affiliated Societies at Scientific Meetings**

(Unchanged)

**Section 4—Delegates from Affiliated Societies at Meetings of General Council**

(Unchanged)

**CHAPTER IV.—ANNUAL MEETINGS****Section 1—Time and Place of Meetings**

(Unchanged)

**Section 2—Arrangements for Annual Meetings**

When the Canadian Medical Association meets in a Province, the meeting of the Division of that Province for that year shall be for business purposes only. The local arrangements shall be under the direction of the Executive Committee of the Canadian Medical Association, which may enlist the assistance of the Division or one of its component societies. The Canadian Medical Association assumes full control of the proceedings of the meeting and of all financial obligations save entertainment.

**Section 3—Type of Program**

(Unchanged)

**Section 4—Presiding Officer**

(Unchanged)

**Section 5—Rules of Order**

(Unchanged)

**CHAPTER V.—MEETINGS OF SECTIONS****Section 1—Sectional Scientific Sessions**

(Unchanged)

**Section 2—Appointment of Sectional Officers**

(Unchanged)

**Section 3—Presiding Officers at Meetings of Sections**

(Unchanged)

**PRESENT CONSOLIDATED CONSTITUTION***Section 4—Duties of Secretaries of Sections*

The Secretary of the Section shall keep a correct record of the transactions and shall transmit it to the General Secretary for insertion in the Minute Book provided for the purpose.

**CHAPTER VI.—OFFICERS AND EXECUTIVE COMMITTEE***Section 1—Appointment of Nominating Committee*

(a) The General Council at its first session at the time of the annual meeting shall elect by ballot from among its members present a Nominating Committee of NINE, not including the President who shall be *ex officio* a member of the Committee and the Chairman thereof.

(b) Each Division in The Association is entitled to appoint from amongst its delegates to General Council one member to the Nominating Committee. Provided this nomination be made in writing to the General Secretary prior to the annual meeting and the delegate so nominated be present, he shall be declared elected to membership on the Nominating Committee.

(c) Upon completion of the election of Divisional Representatives as provided for in clause (b) of this section, any vacancies which remain shall be filled by nominations from the floor. The list so nominated shall contain the name of at least one member of each Branch Association represented at this session. The candidate of a Branch Association who obtains the highest vote amongst the candidates of that Branch Association shall be declared elected. The remaining members, if any, shall be declared elected by majority vote. This election shall be declared on a single ballot and the Chairman of General Council shall if necessary give the casting vote or votes.

*Section 2—Duties of Nominating Committee*

The Nominating Committee shall meet on the day of its election and submit to a later session of the General Council:

1. Nomination of the following officers of The Association: A President-Elect, a Chairman of the General Council and an Honorary-Treasurer.

2. Nomination of an Executive Committee which, in addition to those who are members *ex officio* (see Chapter VIII, Section 4), shall consist of thirteen members drawn from General Council and geographically distributed as follows: three shall be resident in each Province in which an office of The Association is located and one shall be resident in each of the other provinces.

3. Nomination from members of General Council of nine alternates for the elected members of the Executive Committee. There shall be one alternate nominated from each Province. The function of the alternates shall be to act in the place of an elected member of the Executive Committee who is absent because of death or illness or from cause acceptable to the President.

4. At its session, the Nominating Committee may receive in writing,

(1) Each Division's official nomination of the candidate or candidates for representation on the Executive Committee to which the Division is entitled; and also,

(2) Each Division's official nomination of one alternate who will act in the absence by reason of death or illness or from cause acceptable to the President, of the member or one of the members representing that Division. In the event of such an official nomination by a Division being rejected by the Nominating Committee the reasons for such action shall be incorporated in its report to General Council.

5. *Rules of Procedure*—The Committee shall be called to order by the President as Chairman of the Committee. In the absence of the President, the General Secretary shall convene the Committee and request the Committee to select, by open vote, the Chairman. The Committee shall then proceed to carry out its duties by open vote. In case of a tie vote the Chairman shall have the casting vote in addition to the vote to which he is entitled as a member of the Committee. When called for, the report of the Committee shall be presented to the General Council by the General Secretary.

**PROPOSED CONSTITUTION***Section 4—Duties of Secretaries of Sections*

(Unchanged)

**CHAPTER VI.—OFFICERS AND EXECUTIVE COMMITTEE***Section 1—Appointment of Nominating Committee*

(a) (Unchanged).

(b) (Unchanged).

(c) Upon completion of the election of Divisional Representatives as provided for in clause (b) of this section, any vacancies which remain shall be filled by nominations from the floor. Election shall be by majority vote, on a single ballot and the Chairman of General Council shall if necessary give the casting vote.

*Section 2—Duties of Nominating Committee*

(Unchanged).

1. (Unchanged).

2. (Unchanged).

3. (Unchanged).

4. (Unchanged).

*5—Rules of Procedure*

(Unchanged)

**PRESENT CONSOLIDATED CONSTITUTION****Section 3—Election of Officers and Executive Committee**

When the report of the Nominating Committee has been received by the General Council in session, other nominations may also be received from the floor. A ballot shall then be taken for each of the offices in turn and also for elective membership of the Executive Committee by Provinces.

**CHAPTER VII.—DUTIES OF OFFICERS****Section 1—Duties of the President**

The President shall preside at the general sessions of The Association and shall perform such duties as custom and parliamentary usage require. He shall deliver a presidential address. He shall be a member *ex officio* of all committees of The Association. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

**Section 2—Duties of the President-Elect**

The President-Elect shall be installed and shall assume the office of President at the first general session of the Annual Meeting next following his election to the office of President-Elect. He shall be a member *ex officio* of all committees of The Association excepting the Nominating Committee. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

**Section 3—Duties of the Chairman of General Council**

The Chairman of the General Council shall preside at all meetings of the General Council. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association. He shall be a member *ex officio* of all Committees, excepting the Nominating Committee.

**Section 4—Duties of the Honorary-Treasurer**

The Honorary-Treasurer shall be the custodian of all moneys, securities and deeds which are the property of The Association. He shall pay by cheque only. Such cheques shall be signed by two persons authorized by the Executive Committee to sign cheques of The Association and shall be covered by voucher. He shall prepare an annual financial statement audited by a chartered accountant. He shall furnish a suitable bond for the faithful discharge of his duties. The cost of the bond shall be borne by The Association. He may receive for his services an honorarium to be determined by the General Council. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association. He shall be a member *ex officio* of the Executive Committee.

**Section 5—Duties of the General Secretary**

The General Secretary shall be the Secretary also of the General Council and of the Executive Committee of The Association. He shall also be a member *ex officio* of all Committees of The Association. He shall give due notice of the time and place of all annual and special general meetings, by publishing the same in the official *Journal* of The Association, or, if necessary, by notice to each member. He shall keep the minutes of the meetings of the General Council and of the Executive Committee in separate books and shall provide minute books for the secretaries of the different sections which he shall require to be properly attested by the secretaries thereof. He shall notify the officers and members of committees of their appointment and of their duties in connection therewith. He shall publish the official program of each annual meeting. He shall perform such other duties as may be required of him by the President, the General Council or the Executive Committee. All his legitimate travelling expenses shall be paid for him out of the funds of The Association and he shall receive for his services a salary to be determined by the Executive Committee.

**PROPOSED CONSTITUTION****Section 3—Election of Officers and Executive Committee**

(Unchanged)

**CHAPTER VII.—DUTIES OF OFFICERS****Section 1—Duties of the President**

(Unchanged)

**Section 2—Duties of the President-Elect**

(Unchanged)

**Section 3—Duties of the Chairman of General Council**

(Unchanged)

**Section 4—Duties of the Honorary-Treasurer**

(Unchanged)

**Section 5—Duties of the General Secretary**

(Unchanged)

**PRESENT CONSOLIDATED CONSTITUTION****CHAPTER VIII.—THE GENERAL COUNCIL****Section 1—Meetings of the General Council**

The General Council shall meet for at least the first two days of the annual meeting of The Association and thereafter, while The Association is in session, at the call of the Chairman. Before the close of the annual meeting it shall elect the officers and the Executive Committee and select the place for the next annual meeting, or, if thought advisable, for meetings up to three years in advance.

**Section 2—Special Meetings of General Council**

During the interval between annual meetings the General Council shall meet at the call of the Executive Committee. For all such meetings of the General Council due notice shall be sent to each member, stating the purpose of the meeting. The Executive Committee, if it so decide, instead of calling such meetings of the General Council may refer important questions to the General Council and obtain its decision by means of a mail ballot. In the event of a mail ballot being taken, two-thirds majority vote shall govern.

**Section 3—Duties of the General Council**

The General Council shall have supervision of all properties and of all financial affairs of The Association. It shall, through its officers, conduct all business and correspondence, and shall keep a record of all meetings and the receipt and expenditure of all funds, and shall report upon same in the *Journal* after the annual meeting.

**Section 4—The Executive Committee may act for the General Council**

In order that the business of The Association may be facilitated during the interval between meetings of the General Council, the Executive Committee shall meet from time to time at the call of its Chairman, and shall have all the rights and powers of the General Council. It shall conduct all necessary business. In case of a vacancy in any office on account of death or otherwise, it shall have power to appoint a successor. In case of a vacancy occurring in the Executive Committee itself by death or otherwise, it shall have power to appoint a successor upon receiving an official nomination from the Branch Association or Division concerned.

The President, the President-Elect, the Chairman of the General Council, the Honorary-Treasurer, the General Secretary, the Editor and the Managing Editor shall be members *ex officio* of the Executive Committee, but only the elective officers shall have the right to vote.

**CHAPTER IX.—COMMITTEES****Section 1—Duties and Powers of the Executive Committee**

The Executive Committee shall hold one or more sessions before the close of the annual meeting at which it is elected. At its first meeting it shall elect its Chairman and appoint the Chairmen of the Standing Committees for the ensuing year. Between the meetings of the General Council, the Executive Committee shall represent the General Council in all its business affairs and shall exercise all the rights and powers of the General Council. The Executive Committee shall report to the General Council at the annual meeting and at such other times as the Chairman of the General Council may request.

The Executive Committee may meet when and where it may determine. On the request in writing of any three members (with voting power) of the Executive Committee, the Chairman shall call a special meeting. Seven members (with voting power), exclusive of the Chairman, shall constitute a quorum for the transaction of business.

The Executive Committee shall be responsible for the appointment of the General Secretary, the Editor, the Managing Editor, the Associate Secretaries, and any other appointive officers, and shall fix their salaries.

**PROPOSED CONSTITUTION****CHAPTER VIII.—THE GENERAL COUNCIL****Section 1—Meetings of the General Council**

(Unchanged)

**Section 2—Special Meetings of General Council**

(Unchanged)

**Section 3—Duties of the General Council**

(Unchanged)

**Section 4—The Executive Committee may act for the General Council**

In order that the business of The Association may be facilitated during the interval between meetings of the General Council, the Executive Committee shall meet from time to time at the call of its Chairman, and shall have all the rights and powers of the General Council. It shall conduct all necessary business. In case of a vacancy in any office on account of death or otherwise, it shall have power to appoint a successor. In case of a vacancy occurring in the Executive Committee itself by death or otherwise, it shall have power to appoint a successor upon receiving an official nomination from the Division concerned.

(Unchanged)

**CHAPTER IX.—COMMITTEES****Section 1—Duties and Powers of the Executive Committee**

(Unchanged)

**PRESENT CONSOLIDATED CONSTITUTION**

The Executive Committee shall have charge of the publication of the official *Journal* of The Association and of all published proceedings, transactions, memoirs, essays, papers and programs of The Association.

The Editor and Managing Editor shall present annual reports to the General Council and interim reports at each meeting of the Executive Committee. The Editor shall be reimbursed for his legitimate travelling expenses incurred on Association business. The Executive Committee may appoint Editorial Boards to assist the Editors.

The Executive Committee shall appoint the Auditor and shall have the accounts of the Honorary-Treasurer audited annually, or more often if desirable, and shall make an annual report on the same to the General Council.

Each member of the Executive Committee shall be reimbursed for his legitimate travelling expenses incurred in attending meetings of the Executive Committee other than the first meeting or meetings of the new Executive Committee, which may be held before the close of the annual meeting.

**Section 2—Committee on Legislation**

Matters relating to medical legislation, Federal or Provincial, and matters requiring legislative action arising within The Association, may be referred by the Executive Committee to the Committee on Legislation for consideration and advice.

**Section 3—Committee on Medical Education**

To the Committee on Medical Education shall be referred all matters pertaining to medical colleges and medical education. It shall report upon the condition of medical education throughout Canada and upon any proposed change, and may suggest methods for the improvement of medical education.

**Section 4—Post-Graduate Committee**

To the Post-Graduate Committee shall be delegated the responsibility of carrying out the post-graduate plans of The Association.

**Section 5—Committee on Program**

This Committee, with the assistance of the Chairman and Secretary of each scientific section, shall have complete charge of the preparation of the scientific program for the annual meeting.

**Section 6—Committee on Constitution and By-Laws**

To the Committee on Constitution and By-Laws shall be referred all matters relating to the subject before action thereon is taken by the General Council.

**Section 7—Committee on Archives**

The Committee on Archives shall be responsible for collecting as far as possible (a) the obituaries of members dying since the last annual meeting; (b) all documents and information relating to the various members and activities of The Canadian Medical Association which are deemed worthy of preservation. The Editor of the *Journal* shall be a member *ex officio* of this Committee.

**Section 8—Committee on Public Health**

It shall be the duty of this committee to study and report upon all matters of Public Health which, in the opinion of the Committee, should engage the attention of The Association. To the Committee may be delegated such duties in relation to Public Health as in the opinion of General Council or Executive Committee should be undertaken by the Committee on behalf of The Association.

**Section 9—Committee on Ethics and Credentials**

To this Committee all matters of ethics and special questions of credentials shall be referred for consideration and report to the General Council or the Executive Committee.

**PROPOSED CONSTITUTION****Section 2—Committee on Legislation**

(Unchanged)

**Section 3—Committee on Medical Education**

(Unchanged)

**Section 4—Post-Graduate Committee**

(Unchanged)

**Section 5—Committee on Program**

(Unchanged)

**Section 6—Committee on Constitution and By-Laws**

(Unchanged)

**Section 7—Committee on Archives**

(Unchanged)

**Section 8—Committee on Public Health**

(Unchanged)

**Section 9—Committee on Ethics and Credentials**

(Unchanged)

**PRESENT CONSOLIDATED CONSTITUTION***Section 10—Committee on Economics*

It shall be the duty of the Committee on Economics, excepting where otherwise provided, to deal with (a) social legislation which includes medical services or benefits presumably for medical services; (b) remuneration and employment of physicians by lay bodies, hospital or official bodies, including Federal, Provincial and Municipal Governments; (c) to report thereon with such recommendations as it may see fit to the General Council.

*Section 11—Committee on Pharmacy*

It shall be the duty of the Committee on Pharmacy to deal with (a) all matters arising out of the British Pharmacopœia or any Canadian Formulary or Pharmacopœia; (b) all matters arising out of the drug section of the Food and Drugs Act, the Narcotic Act, or the Patent and Proprietary Medicine Act; and (c) any inquiries from members of The Association relating to the use or standards of drugs.

*Section 12—Hospital Service Committee*

This Committee shall act in an advisory capacity to the Hospital Service Department of The Association.

*Section 13—Committee on Cancer*

This Committee shall act in an advisory capacity on all matters relating to the study and control of cancer.

*Section 14—Committee on Maternal Welfare*

To this Committee shall be referred for consideration all matters concerning maternal welfare. It shall be the duty of the committee to devise and recommend to General Council ways and means for the reduction of maternal mortality and the improvement of maternal welfare.

*Section 15—Committee on Nutrition*

It shall be the duty of the Committee on Nutrition, subject to the approval of the Executive Committee, (a) to initiate studies upon the nutritional needs of the public of Canada; (b) upon request from public bodies, to act in an advisory capacity upon nutritional problems; and (c) to adopt measures, educational or otherwise, likely to improve the nutritional standards of the public of Canada.

See New Section 16.

See New Section 17.

*Section 18—Special Committees*

Each Special Committee shall assume, by direction, such duties as are allotted to it, and shall make progress reports to the Executive Committee at each of the meetings of that body or at any other time that such reports may be required by the President, the Chairman of the General Council, or the Executive Committee.

*Section 19—Reports of Committees*

Reports of all Committees shall be printed and mailed to all members of the General Council at least one week before the annual meeting.

**PROPOSED CONSTITUTION***Section 10—Committee on Economics*

(Unchanged)

*Section 11—Committee on Pharmacy*

(Unchanged)

*Section 12—Hospital Service Committee*

(Unchanged)

*Section 13—Committee on Cancer*

(Unchanged)

*Section 14—Committee on Maternal Welfare*

(Unchanged)

*Section 15—Committee on Nutrition*

(Unchanged)

*Section 16—Committee on Industrial Medicine*

It shall be the duty of the Committee on Industrial Medicine:

1. To define the objectives, scope and methods of Industrial Medicine.
2. To determine what medical services now exist in industry, what need exists and what facilities in personnel are available to meet it.
3. To consider and suggest what qualifications and training, undergraduate and postgraduate, are necessary for the physician, nurse and first aid worker in industry.
4. To assist in keeping the medical profession informed of developments in this field with a view to improving industrial health.

*Section 17—Committee on Membership*

It shall be the duty of the Committee on Membership to initiate such plans as are likely to increase the Membership of the Canadian Medical Association, with the eventual objective of enlisting every Canadian doctor in the Association.

*Section 18—Special Committees*

(Unchanged)

*Section 19—Reports of Committees*

(Unchanged)

**PRESENT CONSOLIDATED CONSTITUTION***Section 20—Limitations of Committees re Finances*

No Committee shall expend any moneys or incur any indebtedness or obligation on behalf of The Association without the sanction of the General Council or the Executive Committee.

**CHAPTER X.—ADDRESSES AND PAPERS***Section 1—Addresses at Annual Meeting*

All addresses delivered at an annual meeting shall immediately become the property of The Association, to be published or not, in whole or in part, as deemed advisable, in the *Journal* of The Association. Any other arrangements for their publication must have the consent of the author or of the reader of the same and of the Editor of the *Journal*.

*Section 2—Publication of Papers Presented at Annual Meeting*

All papers, essays, photographs, diagrams, etc., presented in any Section shall become the property of The Association to be published in the *Journal* of The Association or not, as determined by the Editor, and they shall not be otherwise published except with the consent of the author and of the Editor of the *Journal*.

*Section 3—Disposition of Papers Presented at Annual Meeting*

Each author of a paper read before any Section shall, as soon as it has been read, hand it with any accompanying diagrams, photographs, etc., to the Secretary of the Section before which it has been presented. The Secretary shall endorse thereon the fact that it has been read in that Section, and shall then transmit it to the Editor of the *Journal*.

**CHAPTER XI.—PROVISIONS FOR DISCIPLINE**

*Section 1*—If any Member of The Association, after due inquiry by the Executive Committee shall be judged to have been guilty of disgraceful conduct in any professional respect, he shall be liable to censure, suspension or expulsion from membership in The Association by resolution of the Executive Committee, confirmed by a three-fourths vote at the next annual meeting of General Council.

*Section 2*—Should any member of The Association be convicted of any criminal offence, or have his name removed from the register of the Medical Council of Canada, or of the licensing body of any Province of Canada, because of felonious or criminal act, or disgraceful conduct in any professional respect, the Executive Committee may, by resolution, confirmed at the next ensuing annual meeting of the General Council, by a three-fourths vote of those present, censure or suspend or expel such persons from membership in The Association.

*Section 3*—Any member suspended or expelled by resolution as aforesaid, shall thereby forfeit all his rights and privileges as a member of The Association.

*Section 4*—Any member suspended or expelled by resolution as aforesaid, shall, subject to conditions imposed by the Executive Committee, be restored to membership upon resolution of the Executive Committee, confirmed at the next ensuing annual meeting of General Council.

*Section 5*—By subscribing to the application for membership under the terms of the By-Laws and Code of Ethics (see Appendix) and becoming a member of The Association, every member attorns to these By-Laws, and agrees to such right of discipline as aforesaid, and thereby specifically waives any right or claim to damages in the event of his being so disciplined.

**PROPOSED CONSTITUTION***Section 20—Limitations of Committees re Finances*

(Unchanged)

**CHAPTER X.—ADDRESSES AND PAPERS***Section 1—Addresses at Annual Meeting*

(Unchanged)

*Section 2—Publication of Papers Presented at Annual Meeting*

(Unchanged)

*Section 3—Disposition of Papers Presented at Annual Meeting*

(Unchanged)

**CHAPTER XI.—PROVISIONS FOR DISCIPLINE**

*Section 1*—(Unchanged).

*Section 2*—(Unchanged).

*Section 3*—(Unchanged).

*Section 4*—(Unchanged).

*Section 5*—(Unchanged).

**PRESENT CONSOLIDATED CONSTITUTION****CHAPTER XII.—AMENDMENTS**

*Section 1*—Notice of motion by one or more members to amend the By-Laws, must be placed in the hands of the General Secretary three months before the date of the annual meeting.

*Section 2*—Amendments may be proposed by the General Council, the Executive Committee, or the Committee on Constitution and By-Laws without notice of motion, but the proposed amendments shall be published in the *Journal* in two issues preceding the annual meeting.

*Section 3*—The By-Laws shall be amended by a two-thirds vote of the members of the General Council in session present and voting.

**CHAPTER XIII.—THE OFFICE**

Until changed by General Council, the offices of The Association shall be at Toronto and Montreal.

NOTE: Throughout these By-Laws, masculine designations are to be interpreted as including feminine.

**PROPOSED CONSTITUTION****CHAPTER XII.—AMENDMENTS**

*Section 1*—(Unchanged).

*Section 2*—(Unchanged).

*Section 3*—(Unchanged).

**CHAPTER XIII.—THE OFFICE**

(Unchanged)

All of which is respectfully submitted.

R. I. HARRIS,  
Chairman.

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## Medical Societies

**The Academy of Medicine, Toronto**

The thirty-fifth annual meeting of the Academy of Medicine, Toronto, was held in Osler Hall, 13 Queen's Park, on May 5, 1942. The report of the Honorary Secretary, Dr. E. W. Mitchell, showed the total number of Fellows to be 1,198, 180 of whom are on active service with His Majesty's forces.

The reports from the various officers and committees reviewed the many activities of the past year. The library now contains 30,346 volumes, an increase of 760 for the past year. The Academy appreciates gifts from its own Fellows and from friends interested in its endeavour to build up a worth while medical library and museum.

The Council of the Academy, in co-operation with the Library Committee, is helping to provide medical libraries for overseas medical units recruited from the Toronto district, and contributions of money have already been sent to purchase medical books and periodicals for the use of Canadian medical units in England.

The Academy was fortunate in hearing addresses from a number of distinguished visiting physicians and surgeons from Canada and the United States. Very interesting and varied programs were presented at the stated, special and sectional meetings, and subjects of interest to the profession and public alike were discussed.

Dr. Charles J. Copp, the retiring President, was highly complimented on his successful year in office.

The election of new officers and members of Council resulted as follows:

*President*.—Dr. Samuel Johnston; *Vice-president*.—Dr. Robin Pearse; *Honorary Secretary*.—Dr. J. Z. Gillies; *Honorary Treasurer*.—Dr. Roy H. Thomas; *Members of Council*.—Drs.

William Boyd, W. A. Burr, Gordon C. Cameron, R. E. Davidson, Chas. Harris, R. I. Harris, I. D. Kitchen, H. I. Kinsey, William Magner, Roy Malyon, E. W. Mitchell and P. A. Sarjeant; *Chairmen of Sections*.—*Medicine*, Dr. W. A. McTavish; *Surgery*, Dr. Walter Carscadden; *Pathology*, Dr. G. F. Laughlen; *Oto-laryngology*, Dr. C. S. Macdougall; *Anæsthesia*, Dr. Norman S. Clark; *Urology*, Dr. D. R. Mitchell; *Neurology and Psychiatry*, Dr. E. F. Brooks; *Ophthalmology*, Dr. R. G. C. Kelly; *Preventive Medicine and Hygiene*, Dr. Gordon Bates; *Pædiatrics*, Dr. G. A. McNaughton; *Obstetrics and Gynæcology*, Dr. B. E. Meek. J. Z. GILLIES

**The College of Physicians and Surgeons of British Columbia****SPECIAL ANNOUNCEMENT**

Owing to the large number of doctors from British Columbia who are now serving with His Majesty's Forces (about 20 per cent), and the consequent shrinkage in the number of those available to serve the needs of the civil population, and to the restrictions placed upon the supply of gasoline and automobile tires, an appeal is hereby made to conserve the time and energy of your doctor, his automobile tires, and gasoline, and by doing this to make it possible for him to carry on in such a way that none shall suffer during these war years.

All members of the public are asked: (1) to make no demands for unnecessary calls; (2) not to expect daily visits; (3) to see the doctor at his office when possible; (4) to notify the doctor early in the morning of the need of a visit to the patient's home. This avoids duplication in travel. The supply of gasoline for doctor's cars is definitely restricted. There is no assurance that tires for replacement on cars will be available.

Every physician and surgeon in British Columbia is a registered and licensed member of the College of Physicians and Surgeons of British Columbia.

W. A. CLARKE, *President*  
A. J. MACLACHLAN, *Registrar*

### Gander Medical and Dental Society

The Medical and Dental Officers of the Sir Frederick Banting Memorial Hospital, R.C.A.F., Gander, Newfoundland, had a meeting in October, 1941, and decided to form a society known as "The Gander Medical and Dental Society", the purposes of which are as follows: the improvement of medical and sanitary arrangements at the station; the discussion of medical problems for the mutual benefit of the members and to encourage co-operation between medical services of the forces at Gander.

Meetings are held by "The Gander Medical and Dental Society" every other Wednesday. These meetings have had 100 per cent attendance and are very instructive and helpful.

It was thought at the meeting that the Society would write to the Canadian Medical Association, American Medical Association, Canadian Dental Association, and Surgeon General's Department, U.S.A., seeking recognition from these bodies.

G. W. LEWIN, *Secretary Treasurer*,  
Capt. R.C.A.M.C.

MEMBERS.—*Medical*: Wing Comm. L. H. Leggett, (*President*); Squad. Leader G. G. Elder; Squad. Leader D. H. Hubbs; Flight Lt. F. T. Howell; Flight Lt. D. Graham; Capt. G. W. Lewin, (*Secretary Treasurer*); Major Burwell, (*Vice-president*); Lt. N. L. Lippman; Lt. M. Grayson. *Dental*: Capt. R. R. Wilson; Capt. L. H. Cameron; Lt. M. P. Warshewski; Lt. E. S. Stallard.

[NOTE.—Affiliation with the Canadian Medical Society has been granted.—ED.]

### Montreal Physiological Society

The regular meeting of the above-mentioned Society was held in the Medical Building, McGill University, on March 16, 1942. The following papers were presented.

SOME MODIFICATIONS IN THE FLUORIMETRIC METHODS FOR THE DETERMINATION OF THIAMIN AND RIBOFLAVIN.—R. A. Chapman (introduced by W. D. McFarlane), Chemistry Department, Macdonald College.

PLASMA PHOSPHATASE ACTIVITY IN RELATION TO THE CHICK ASSAY FOR VITAMIN D.—W. D. Graham (introduced by W. D. McFarlane), Department of Animal Nutrition, Ontario Agricultural College, Guelph (now, Department of Agricultural Chemistry, Macdonald College).

*Abstract*.—A method for the determination of the alkaline phosphatase activity of chick blood plasma has been worked out. It was found that this enzyme was strongly activated by magnesium ion in relatively high concentrations. Glycine and manganese, while

perhaps of significance under other conditions, produced no striking activation of the enzyme. Oxalate, in the concentration used in this work, appeared to have no significant inhibiting effect on the phosphatase activity. Complete haemolysis of the blood, however, decreased the activity by about one-third. Dialysis of the plasma solution reduced the phosphatase activity to a level where measurable differentiation may be very difficult. Enzyme digestions are carried out for fifteen minutes at a pH of 9.7 to 9.8 and a temperature of 30° C. in ammonium hydroxide-ammonium chloride buffer. The degree of correlation between chick plasma phosphatase activity and bone ash per cent or vitamin D intake, reaches a maximum when the chicks are four to five weeks of age. Considering the 20 per cent error allowed on biological assays, vitamin D bioassays on various D-potent substances, using the phosphatase method, seem to give fairly good results as compared with the regular A.O.A.C. chick method.

### MEASURING THE DEPTH OF ANÆSTHESIA BY THE STUDY OF THE LINGUO-MAXILLARY REFLEX.—

J. A. Blais, Henri Laugier and E. Robillard (introduced by Henri Laugier), Physiological Department, University of Montreal.

*Abstract*.—A new method was proposed to measure the depth of anaesthesia. It was based on the determination of the threshold of the linguo-maxillary reflex. This reflex consists in the lowering of the inferior jaw provoked by a single and abrupt excitation on the tongue. Two electrodes were solidly fixed in the mucosa of the palate and maintained there during the whole course of the experiment, carrying the electrical stimuli. The stimuli were induction shocks produced by an inductorium graduated in electricity quantities. The continuous measuring of the threshold of the linguo-maxillary reflex allowed us to follow at every moment the absorption and elimination of the anaesthetic. The necessary amount of electricity needed at each moment to obtain the threshold was our criterion of anaesthesia. The deeper the anaesthesia, the higher became the threshold. The experiments were carried out on dogs and various anaesthetics were used, such as chloroform, ether, cyclopropane, nembutal, pentothal, chloralose, chloral-morphine and urethane. A curve was established for each one.

R. L. NOBLE,  
*Secretary*.

## Correspondence

### Poisoning by Phenol

To the Editor:

In the May issue of the "Reader's Digest" there is an article written by Paul de Kruif on the work of Dr. Edward Francis, describing treatment of "Athlete's Foot" by a mixture of pure phenol and camphor.

In this connection I would like to cite the following case from my own experience, some time ago.

H. Charest, aged 18, returned from lumbering in the north woods with severe ringworm on the right shoulder and scapular region, about 8" x 6" and excoriated. There were also several smaller areas of ringworm over the left arm and trunk; total area involved would be about

60 square inches. He was advised by one of the neighbours to try this mixture of camphor and carbolic acid. He secured one ounce of camphor and four ounces of carbolic acid from the local drug store and mixed them.

That evening, he stripped to the waist and had his housekeeper rub the mixture over the area of ringworm. Before the application was completed he became faint and dizzy and complained of burning. The housekeeper thought the mixture might be too strong and diluted some of it with water in a saucer and continued the application. Almost immediately he became dyspnoeic and staggered to the door with the help of his father. He stood there a few minutes and then was helped to his bed, where he turned over on his face and died. It was estimated that death took place within 15 minutes from the commencement of the application.

The post-mortem was performed by Dr. A. G. Ross and myself. The mouth was filled with dark frothy blood. We found both lungs very congested, the left particularly being almost black and containing air only in the upper lobe. There was a small amount of blood in the pericardium, the left side of the heart was contracted and the right side was dilated. The thymus gland, kidneys and spleen seemed congested. We made a diagnosis of acute pulmonary oedema following application of pure carbolic acid with camphor to a large excoriated area of ringworm.

Specimens of each lung, the thymus, liver, spleen and kidney were sent to the Provincial Laboratory, and Dr. J. J. Ower reported as follows.

"Sections of lung, liver, kidney and thymus all show very marked congestion. From the history of this case this would appear to be a case of carbolic acid poisoning. Similar cases have been reported in the literature in which death has followed absorption of carbolic acid even from the intact skin. The presence of an inflammatory lesion in the skin as was present in this case would also increase the rate of absorption." Dr. Ower appended the report by the Provincial Analyst, Mr. James A. Kelso, M.Sc. Mr. Kelso reported that carbolic acid was found in the stomach, heart, spleen, and kidneys (apparently the lung specimens were not sent to Mr. Kelso). He also stated that the contents of the bottle of the phenol-camphor mixture contained 70.7 per cent of phenol.

Elk Point, Alta.,  
May 4, 1942.

F. G. MILLER.

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It is not unusual to see men rest their opinions upon foundations that have no more certainty nor solidity than the propositions built on them and embraced for their sake. Such foundations are these and the like, namely, "The founders or leaders of my party are good men, and therefore their tenets are true. It is the opinion of a sect that is erroneous, therefore it is false"; "It hath been long received in the world, therefore it is true"; or, "It is new and therefore false".—John Locke.

## Special Correspondence

### The London Letter

(From our special correspondent)

*Rehabilitation.*—It has been said recently that the medical profession in Great Britain is concerning itself with three R's—Reconstruction, Regionalization and Rehabilitation—to which the cynic has added "arguing".

The first of these Sir Farquhar Buzzard took as his theme for the Harveian Oration of the Royal College of Physicians of London for 1941, recently published. In making suggestions for sweeping changes in medical practice the orator wisely went back to the beginning, for he recognized what so many other present-day reformers forget, that fundamental reorganization means changes in medical education and especially intensified study of the social factors underlying the health of the nation. Social factors also come clearly into the present-day developments of rehabilitation which, beginning in industry as a co-ordinated effort to get the injured workman back to his job as soon (and as fit) as possible, shows signs of evolving into a wide reconsideration of the whole principles underlying what has been so loosely termed "convalescence" in the past.

For example, new accident hospitals, developed essentially to deal with road and industrial accidents, are being opened, with great stress laid upon the rehabilitation side. The Seamen's Hospital Society opened their "Albert Dock Hospital and Rehabilitation Centre" in London in 1938 and in 1941 the Queen's Hospital, Birmingham, freed from its obligations as a general hospital by the great new hospital outside the city, became the "Accident Hospital". While the segregation of accident cases under one roof, separated from existing departments of surgery, is perhaps open to criticism, there is no doubt that as regards the development of rehabilitation the idea is sound. Few general hospitals have the necessary space (or funds) to provide all that is embraced under this heading. Supervised physical activity, gymnastic exercises, and swimming are all mentioned as important. Occupational therapy is also to be developed and includes weaving, carpentry and other handicrafts designed to keep the patient interested, while his muscles are unconsciously exercised. Team games are also included and a vocational training centre is also required if the injured workman has to be trained for some new job.

In the Royal Air Force rehabilitation plays a most important part, for trained personnel are wanted back at work as soon as possible. In the hospital wards exercise leaders and rehabilitation orderlies (called "muscle mechanics"! ) are employed for helping especially the recovering victims of burns and fractures.

Rehabilitation centres, remote from general hospitals, have also been developed where open air and a change of surroundings do much to assist the rehabilitation team consisting of one medical officer, one physical training instructor and one masseuse for every group of 50 patients. Each centre also has an organizer of games and apart from "work" in the gymnasium and on the playing fields evening recreations are planned to keep muscles moving round billiard tables, ping-pong tables or in front of dart boards.

On a wider scale the Ministry of Labour's scheme for the training and resettlement of disabled persons has, it is now announced, been taken officially to include certain discharged tuberculosis patients. The tuberculosis officer is able to discuss each patient with a representative of the Ministry of Labour and medical supervision is to be carefully continued in the training centres. This new development of rehabilitation has been enthusiastically welcomed by the Tuberculosis Association who point out that the principle of part-time employment with subsidized wages is essential for the success of the scheme.

*End of the bread controversy.*—Since war began thousands of words have been expended in print on the question of wholemeal bread. It will be remembered that during the 1914-18 war white flour was officially abolished to save shipping space, and many have wondered why during the present struggle when shipping is equally if not more important the same argument has not been applied. Indeed there has been a suspicion that the interest of the millers has been allowed too great a consideration. But whereas shipping is a matter for Cabinet consideration the nation's health very definitely concerns the medical profession, who with a degree of unanimity seldom reached on any health topic have agreed whole-heartedly in advocating wholemeal bread.

At a recent meeting of the Nutrition Society the subject was raised in several ways at a general discussion on food production and distribution. Our war-time diet is remarkably good in most directions (although a little dull!) but more than one speaker emphasized that so long as white flour was official there was a danger of deficiency, especially as regards nicotinic acid. Part of the Nutrition Society's discussion dealt with the rival claims of man and animals as regards food. The supply of cereals and concentrates for animals has been almost halved since war began and one of the arguments against the use of wholemeal flour has been that 85 per cent extraction flour means less "offals" for the feeding of animals, so that wholemeal bread as a national policy may mean still more loss of animal feeding stuffs and theoretically less milk, meat and eggs. But at long last the arguments on both sides have been silenced, for, from April 6th, white bread will

no longer be available and what is called "national wholemeal" must be used. It is not yet absolutely clear that this is entirely what the food experts really want for it is claimed that brown bread can be made from white flour diluted with road sweepings—and pass the necessary requirements! But perhaps this is merely the swan song of the controversialists, who are now to be deprived of their staple diet! The whole affair has been a little unsavoury and we all hope for a national flour and loaf which is free from this criticism.

*Cancer campaign inquiry.*—In 1938 the British Empire Cancer Campaign began an ambitious task of statistical follow-up of cancer patients, and up to September, 1939, had secured from the records of hospitals in the County of London over 15,000 names. Despite all the upsets produced by air-raids and the evacuation of patients less than 10 per cent have not been traced. During the past year the special region chosen for study was cancer of the uterus. Last year it was cancer of the breast, and alike in both series it has been demonstrated that there is a distressing interval between the time of the first appearance of symptoms and the visit to a doctor. In the case of cancer of the cervix only 26 per cent consulted a doctor within the first month, 45 per cent within the first three months, whilst in 27 per cent symptoms had existed for over six months and in 12 per cent for over a year. Education of the public to overcome this dangerous apathy (or distrust) is urgently necessary if early cancer is to secure that successful treatment which modern science has made possible.

ALAN MONCRIEFF

London, April, 1942.

## Post-Graduate Courses

Journées Médicales Annuelles de la Société  
Médicale de Montréal les 15, 16,  
17 et 18 juin 1942

Sous la présidence d'honneur de l'honorable  
Henri Groulx Ministre de la Santé et du Bien-  
Etre Social.

### PROGRAMME GENERAL

LUNDI, 15 JUIN, HÔPITAL NOTRE-DAME

8 h. 30.—Inscription. Visite des différents services de l'hôpital. Exhibits scientifiques.

9 h. 30.—Séance clinique à l'amphithéâtre.

11 h. 30.—Conférence du Dr J. U. Gariépy, "L'Enseignement de la médecine et la Guerre".

12 h. 30.—Buffet froid gracieusement offert par le Bureau d'Administration de l'hôpital Notre-Dame (Pavillon des Gardes-Malades) aux médecins régulièrement inscrits.

**MARDI, 16 JUIN, HÔPITAL SAINTE-JUSTINE**

8 h. 30.—Inscription. Visite des différents services de l'hôpital. Exhibits scientifiques.

9 h. 30.—Séance clinique à l'amphithéâtre.

11 h. 30.—Conférence du Dr L. C. Simard, "La recherche scientifique en médecine et la Guerre".

12 h. 30.—Buffet froid gracieusement offert par le Bureau d'Administration de l'hôpital Sainte-Justine.

**MERCREDI, 17 JUIN, HÔPITAL SAINT-LUC**

8 h. 30.—Inscription. Visite des différents services de l'hôpital. Exhibits scientifiques.

9 h. 30.—Séance clinique à l'amphithéâtre.

11 h. 30.—Conférence du Dr Adelard Groulx, "Le C.P.C. et la profession médicale".

12 h. 30.—Buffet froid gracieusement offert par le Bureau d'Administration de l'hôpital Saint-Luc.

**JEUDI, 18 JUIN, HÔTEL-DIEU**

8 h. 30.—Inscription. Visite des différents services de l'hôpital. Exhibits scientifiques.

9 h. 30.—Séance clinique à l'amphithéâtre.

11 h. 30.—Conférence du Dr Oscar Mercier, "Trois siècles de médecine au Canada français".

12 h. 30.—Buffet froid gracieusement offert par les Religieuses de l'Hôtel-Dieu.

7 h. 30.—Banquet annuel de la Société Médicale au Cercle Universitaire.—Causerie par M. Louis Bourgoïn, I.C.

**RENSEIGNEMENTS**

Les "Journées Médicales Annuelles" sont organisées dans le but de faire connaître à la profession, au moyen de présentation de malades ou de démonstration pratique, la valeur des nouveaux procédés de diagnostic et de traitement en médecine. Elles ont eu lieu, jusqu'ici, en octobre. Elles seront données, cette année, en juin, afin de permettre à nos membres d'assister, en plus grand nombre, et aux "Journées Médicales" et au prochain congrès de l'Association des médecins de langue française de l'Amérique du Nord qui sera tenu en septembre, dans notre ville.

Comme par le passé, ces "Journées" seront données, le matin, dans les hôpitaux et coïncideront avec le Banquet annuel de la Société.

L'inscription aux "Journées Médicales" est gratuite pour les membres et leurs invités: elle donne droit à l'Annuaire et à un insigne.

Au Banquet annuel de la Société: tenue de ville: Prix du couvert: \$2.00.

Le Président,  
G.-L. PRUD'HOMME.

Le Secrétaire-Général,  
PAUL LETONDAL.

**University Notes****Acceleration of Medical Training**

Some idea of the steps being taken to accelerate medical training in Canada may be gathered from the following notes received from the various universities.

**Dalhousie University**

The present fifth year class will graduate at the regular time, that is, on May 12th. The present fourth year class will immediately go into internships, and after an eight months' internship will graduate; this will be about the first week in January.

The present third year class will go into their fourth year after about two and a half weeks' holiday, beginning on May 18th. The classes

of the fourth year will carry through to about the end of December.

The present second year class follows the same schedule as the third year, that is they begin classes on May 18th and carry through until about the end of December.

No alteration with regard to the present first year.

**Laval University**

The course will reopen on July 15th for the 2nd, 3rd, 4th and 5th years. The first year men will begin their work in September. Internship will begin at once at the end of the present year, that is, on June 1st and will continue until the end of January, 1943. Graduation will take place in February, 1943, and again in October or November, 1943.

**McGill University**

Upper class men in medicine will attend a summer session extending from June 15th to August 8th inclusive which will count as a trimester. This will enable the senior class to finish their course and begin their internship on February 1, 1943, and will enable the Junior and Sophomore classes to make corresponding advances in the dates when their training will be completed.

**University of Manitoba**

Details of changes are being settled, but are not yet announced.

**Université de Montreal**

Le Conseil de la Faculté de médecine, en sa réunion du 17 avril 1942, a résolu d'accélérer les cours de médecine, à la demande du gouvernement fédéral du Canada. Voici quel est le programme préliminaire qu'il vient d'adopter:

1°—L'année académique 1941-42 se terminera le 31 mai 1942.

2°—L'année académique nouvelle 1942-43 commencera le 1er juin 1942 pour se continuer jusqu'au 15 juillet.

3°—Du 15 juillet au 1er septembre il y aura suspension des cours durant la période des vacances.

4°—La reprise des cours aura lieu le 1er septembre pour se continuer jusqu'au 31 mars 1943, date à laquelle se terminera cette année académique comprise entre le 1er juin et le 31 mars.

5°—Vu le déménagement de l'Université de la rue Saint-Denis à la Montagne, durant l'été, cette accélération des cours ne s'appliquera qu'aux élèves seniors, soit 3ième, 4ième et 5ième années.

Les cours théoriques et cliniques de ce curriculum seront donnés dans nos hôpitaux d'enseignement qui ont bien voulu mettre des salles de cours à la disposition de la Faculté de médecine.

6°—Les élèves et les professeurs seront avisés du jour, de l'heure et de l'endroit où se fera l'enseignement.

7°—Les élèves de 5ième année continueront, comme par le passé, de suivre leur stage d'internat dans les hôpitaux.

8°—L'année académique 1943 débutera au début d'avril pour se terminer le 31 décembre de la même année, avec suspension des cours durant la période des vacances, du 10 juillet ou 29 août 1943.

Telles sont les directives générales adoptées par le Conseil de la Faculté de médecine et transmises par le Doyen, Docteur Albert LeSage.

#### *Queen's University*

"Our arrangements for speeding up the Medical Course are based on the desire to introduce conformity amongst the medical schools of the province. Our scheme will therefore parallel that of the University of Toronto. We accordingly start our first year on September 22nd, our second year on August 24th, and our later years on June 1st.

"This earlier start in the senior years is necessary to make up the time which Toronto already gained by starting early last session. Our final year students will then graduate sometime in December, and our fifth year in July, 1943."

#### *University of Toronto*

The acceleration of the medical course at the University of Toronto, to meet the shortage of doctors for the Armed Forces and for civilian needs was decided upon in the spring of 1941. The proposed curriculum consisted in lengthening the academic session from 7½ to 10 months in all years of the course but the first, which consists of pre-medical subjects. This procedure will result in graduating a class of students every eight months instead of every twelve as at present.

As it has been considered essential that each graduate should have a period of internship in a hospital in order to round out his education, either to begin private practice or to become a medical officer in the Armed Forces, the hospitals were asked if they would shorten the internship period from 12 months to 8 months in order that medical officers might be made available for military service in as short a time as possible and at the same time provide for the co-ordination of the internship period with the graduation of students every eight months. Provincial licensing bodies were requested to permit the medical curriculum to be completed in a shorter time than their regulations require. Both the hospitals and licensing bodies agreed to the proposed changes as a war measure.

The accelerated curriculum at Toronto came into operation when the second to the sixth

year classes registered on August 25th, 1941, the effects of which are shown in the following Chart:

#### CHART

#### UNIVERSITY OF TORONTO COURSE— GRADUATION, INTERNSHIP, MILITARY SERVICE

1941-1942	Graduation	Internship	Available for Military Service	
			Speeded up Course	Regular Course
Sixth Year	Apr. 30, 1942	May 1, 1942 to Dec. 31, 1942	Jan. 1, 1943	July 1, 1943
Fifth Year	Dec. 31, 1942	Jan. 1, to Aug. 31, 1943	Sept. 1, 1943	July 1, 1944
Fourth Year	July 30, 1943	Sept. 1, to Apr. 30, 1944	May 1, 1944	July 1, 1945
Third Year	Apr. 28, 1944	May 1, to Dec. 31, 1944	Jan. 1, 1945	July 1, 1946
Second Year	Dec. 31, 1944	Jan. 1, to Aug. 31, 1945	Sept. 1, 1945	July 1, 1947

As the result of this speeded-up curriculum the Sixth Year class will take the place of the present class of interns in hospitals on May 1st instead of July 1st, making them available for military service two months earlier than would ordinarily be the case.

This present Sixth Year will be available for the Armed Forces on January 1, 1943, instead of July 1st, or six months sooner; the Fifth Year class will be available ten months earlier, the Fourth Year, fourteen months, the Third Year, eighteen months and the Second Year, twenty-two months earlier.

The curricular changes in the courses of each of the years have only been of a minor character, the time-tables in each year consisting of the three terms of the present course, to which has been added the first term of the next succeeding year in the fourth term from April to June. The total length of the actual instruction is such that each student receives practically the same sound medical training as in the regular course, but in a shorter period of time.

#### *University of Western Ontario*

"In July, 1941, we called our sixth year students in and they finished and graduated on March 11, 1942. We began the course for the second, third, fourth and fifth years on August 25, 1941, and they will continue in school until June 27, 1942. Our present final year class should be finished by the middle of December, 1942. In other words, we are following a continuous program through the year with the exception of the month of July and the first three weeks in August."

### Dalhousie University

On May 12, 1942, Dean of Medicine, Dr. H. G. Grant doffed his mortar board and asked President Carleton Stanley to admit to the degrees of Doctor of Medicine and Master of Surgery forty-two candidates.

To Lewis Benjamin Woolner went the rarely awarded University Medal.

The great majority of the graduates will find posts in the services, the army winning the largest group.

On May 19, 1942, the Medical School opened its doors again, to begin its wartime 1942-43 term.

### The University of Western Ontario

#### Medical Faculty Convocation

The Alumni Gold Medal for the highest standing during six years was won by Max Nareff, who also won the Alpha Kappa Kappa Gold Medal for the highest standing in the sixth year, and the J. B. Campbell Scholarship of \$100.00 for highest standing in medicine and clinical medicine.

The scholarship for the best case records was won by Clinton Amacher, of Hanover. Lawrence Ruttle, of London, was awarded the Khaki University and Y.M.C.A. Scholarships; Allan Douglas, of Detroit, the Reckitt & Colman Prize of \$25.00 for the best work in Obstetrics.

Dr. G. C. Hale administered the Hippocratic Oath to the graduating class of 34 men and 2 women.

## Miscellany

### Farewell, Chocolate Soldier

The American Army has exchanged the chocolate ration of the soldier in the field for five pieces of hard candy, individually wrapped and in assorted flavours (*J. Am. M. Ass.*, 1941, 117: 941). Recent fatigue tests at Minnesota University have shown that men have a greater energy output if they take sugar periodically through the day rather than in large quantities at mealtimes.

Sugar for the Services,  
Candy for the troops—  
A soldier shorn of sugar  
Invariably droops.

If you want your soldiers  
Stiffened at the waist  
Give them sugar candy,  
Flavouring to taste.

Forget Papa's instructions,  
Forget Mamma's appeals—  
The energetic soldier  
Must eat between his meals.

—Taken from the *British Medical Journal*.

## Abstracts from Current Literature

### Medicine

**Blast Chest. The Radiological Aspect of the Pulmonary Changes following Exposure to High Pressure Waves.** Thomas, A. R.: *Brit. J. Radiol.*, 1941, 14: 403.

Experience in Great Britain has shown that proximity to the blast of high explosive may lead to damage to the lungs and pleura, although there is not yet unanimity of opinion with regard to the mechanism causing the pathological changes. Experimentally it has been shown (Zuckerman, 1940) that animals exposed to blast have areas of hæmorrhage into the lung parenchyma, and similar changes have been found at autopsy in the human subject following death as a result of proximity to an explosion. A series of such cases which were non-lethal has been examined radiographically, and in many of these varying degrees of radio-opacity resembling that seen in pulmonary consolidation, have been found. The radiological appearances are in conformity with the pathological changes found in human air-raid victims and in animal experiments. The ribs in the region of the pulmonary damage are approximated posteriorly and separated widely anteriorly, and this, on visual inspection of the patient, gives the chest a "ballooned" appearance, which is in many cases the only physical sign to be found. The pure blast lesions may be complicated by inhalation of water or dust, or by direct trauma, producing fractured ribs, pneumo- or hæmo-pneumo-thorax. In uncomplicated cases the chest lesions are more readily detected by radiological than by clinical examination. Since most cases of this type will need to be examined with portable apparatus, and since the consequence of non-recognition may well be serious, particular care should be paid by radiologists to the interpretation of the films and to the assessment of the damage in "blast chest". —British Med. Inform. Service.

**Prognostic de l'entérite régionale.** Brown, P. W. and Donald, C. J., Jr.: *Am. J. Digest. Dis.*, 1942, 9: 87.

Les conclusions de cette excellente mise au point, sont les suivantes: (1) L'entérite régionale chronique est une maladie grave pouvant survenir sur n'importe lequel segment de l'intestin grele; mais des 92 pour cent des cas rapportés, c'était le segment terminal de l'iléon qui était atteint. (2) Ce syndrome est caractérisé par des rémissions spontanées et des poussées analogues à celles rencontrées au cours de la maladie ulcéreuse, gastro-duodenale ou colique. (3) La maladie tend à progresser, soit en amont ou en aval, amenant un état de inanition prononcée. (4) Maladie affectant les personnes de tout âge, mais cependant beaucoup plus fréquente de 20 à 30 ans, et curieusement, semble

se rencontrer plus fréquemment chez la race juive. (5) Le traitement de choix consiste dans l'exérèse chirurgicale du segment malade. Les auteurs ont l'impression que l'opération en deux temps est préférable à l'intervention en un temps. (6) Ils terminent en insistant sur la nécessité d'une diète riche en protéine supplémentée au besoin par des composants du complexe Vitamin B-.

YVES CHAPUT

### Surgery

#### Criteria of an Acceptable Operation for Ulcer.

Wangensteen, O. H. and Lannin, B.: *Arch. Surg.*, 1942, **44**: 489.

Accumulating evidence indicates clearly that acid is the important factor in the genesis of ulcer. It is not known what are the factors that condition the capacity of the gastric mechanism to secrete acid or what other factors may thwart or favour digestion of tissue by acid. However, that unneutralized hydrochloric acid secreted by the stomach may bring about the formation of ulcer is definitely established. The most important criterion of an acceptable operation for ulcer is that it reduces gastric acidity effectually. The objectives of an acceptable operation are: (1) that it relieves the patient subjectively and removes the ulcer diathesis; (2) that it prevents recurrent ulcer (3) that it does not compromise the future for the patient. It appears that extensive removal of gastric tissue (three-quarter resection) is necessary to ensure achlorhydria and to give assurance of meeting the first two requirements of an acceptable operation. It is the ulcer diathesis of the gastric secretory mechanism which demands the surgeon's notice. In order to secure achlorhydria excision of the antral mucosa is mandatory.

G. E. LEARMONTH

#### The Treatment of Fracture—Dislocation of the Cervical Spine. Rodgers, W. A.: *J. Bone & Joint Surg.*, 1942, **24**: 245.

There has been an increase in the detailed knowledge of this subject and Rodgers analyzes such in his paper. He stressed the importance of open reduction and internal fixation in these cases. The cardinal points of treatment are: (1) the cord must be protected at all times; (2) reduction must be complete or pain and recurrence may ensue; (3) the fixation must be adequate or recurrence will follow.

The first step is the use of the adjustable splint. Then there is the use of skeletal traction with Crutchfield tongs or Hoen's wire, associated with the use of tidal drainage for bladder dysfunction; thirdly in these cases which do not reduce on skeletal traction, open reduction by the posterior mid line approach. The displaced vertebra is reduced and the spinous process wired, in cases of fractured vertebrae to the spinous process above, and in case of dislocation, to the one below, Babcock's stainless steel wire is used. Small chip bone grafts are em-

ployed to assist in fusion. The Thomas collar is used in the external splintage in after treatment. Eleven cases are summarized with excellent results. Nine of the patients returned to work in an average five months. Excellent diagrams of the operation and x-ray plates of cases are included.

H. F. MOSELEY

#### Bile Peritonitis. "Péritonite biliaire". McLaughlin, Ch. W.: *Ann. Surg.*, 1942, **115**: 240.

L'auteur présente huit cas de péritonite biliaire diffuse et localisée. Il examine les différentes manières dont peut surgir cette complication: par perforation, par traumatisme, par infection, par dilatation ou compression. Les conséquences pathologiques de la péritonite biliaire sont toujours graves. Il importe donc de la différencier de l'ascite biliaire que ne signifie pas nécessairement qu'il y ait eu perforation ou infiltration à travers les conduits biliaires. Le bile libre dans la cavité péritonéale produit ses funestes effets par l'action toxique sur les tissus d'un ou de plusieurs des éléments qu'elle contient par l'infection introduite avec la bile dans la cavité péritonéale ou développée à la suite d'une contamination, par un état analogue au shock opératoire, une hémococoncentration conjointe, la diminution du volume sanguin et de la pression artérielle. Ce dernier fait suffit à expliquer que le malade ne soit pas en état de résister aux bactéries—streptocoques, coli-bacilles, anaérobies—qui infectent le bile, mais qui, en d'autres circonstances seraient moins toxiques. Tout récent opéré des voies biliaires en état de shock et qui présente des signes de tachycardie doit être surveillé en ce qui concerne la péritonite biliaire. Le pourcentage de la mortalité, dans les cas de péritonite biliaire, est élevé, allant de 50 à 75 pour cent. Lorsque la péritonite est foudroyante la mort est très rapide et ne permet pas de pratiquer à temps le drainage nécessaire. Une exploration rapide, un drainage adéquat, le minimum de manipulation constituent la thérapeutique immédiate. Par la suite, il faudra chercher à soutenir les forces très diminuées du malade par des transfusions et l'adduction de plasma sanguin.

PIERRE SMITH

#### American Surgery in a Changing World.

Graham, E. A.: *Surg., Gyn. & Obst.*, 1942, **74**: 273.

In his retiring presidential address to the American College of Surgeons, Graham has some pertinent facts in reference to the present world affairs. He gives Shirer's (Berlin Diary) reminder of Rust's (Nazi Minister of Education) radio broadcast "God created the world as a place for work and battle—the strong win out—the weak lose them". In other words, applied to medical and surgical practice—why help the physically weak? Why persist in endeavouring to gain knowledge so more treatments and operations can be done to prevent ill-health and to save life? If America is compelled to maintain

large defence forces where are the funds for research and non-paying patients to come from: they will be swallowed up in extra-taxation. Advances in bacteriology, in experimental medicine, surgery and other allied sciences cannot be limited to any one country and we could never have reached our present peak had there not been free intercommunication of ideas, of visits and of ideals. In order to prevent relapse into an age as degenerate, as cruel and as unhealthy we must continue to experiment and to discover more ways of benefiting mankind. At the same time we must give of our time and of our wholehearted co-operation to the national effort, only by means of which can we hope to continue our chosen work.

FRANK DORRANCE

**Superiority of fine Catgut over fine Silk as a mucosal Suture.** Bower, J. O. and Pearce, A. E.: *Surg., Gyn. & Obst.*, 1942, 74: 649.

Halstead's observations in 1913 in reference to the above technique were not a fair comparison, inasmuch as he used considerably larger catgut than silk in size, and larger needles. The authors report on their observations, using No. 0000 black silk and No. 00000 chromic catgut (both with diameter 0.0006 inches). Gross and microscopic examinations were made on the second, third, fourth, fifth, seventh, tenth and fourteenth days post-operatively. The catgut was managed with greater ease in suturing, caused less tissue trauma, and exhibited much less tissue reaction on each of the examinations: further, "an outstanding and constant feature was the sloughing of the silk through the gastric mucosa, presumably due to pressure necrosis".

FRANK DORRANCE

## Obstetrics and Gynecology

**Aplastic Anæmia in Pregnancy.** Hurwitt, E. S. and Field, L.: *Am. J. Obst. & Gyn.*, 1942, 43: 42.

A case is presented of aplastic anæmia occurring during pregnancy, with fatal issue; clinical, laboratory and pathological data are given. Eighty cases of primary aplastic anæmia in women were collected from the literature; 13 of these were found to be of obstetric significance. Of the total group of 14 cases of aplastic anæmia during pregnancy, there were only 5 survivals. In all of these the uterus had been emptied, 2 by normal delivery at term and 2 by interruption during the third trimester. One case developed post partum. A fatality was recorded in each of the three cases in which there was no interruption of pregnancy. From the evidence at hand it would appear probable that the occurrence of aplastic anæmia during pregnancy may not be coincidental, but that the gravidity may play an etiological or conditioning rôle. Interruption of pregnancy should be strongly considered in the presence of aplastic anæmia.

ROSS MITCHELL

**The Differential Diagnosis of Vaginitis in Menopausal Women.** McLaren, H. C.: *J. Obst. & Gyn. of the Brit. Emp.*, 1941, 48: 742.

The differential diagnosis of post-menopausal vaginitis, is made difficult by the fact that in the normal menopausal vagina thinning of the mucosa and sub-epithelial infiltration produce appearances closely resembling true vaginitis. Nevertheless, with these difficulties in mind, the author advocates the use of mucosal biopsies for the accurate diagnosis of post-menopausal vaginitis. Reliance on one method of investigation, whether clinical or laboratory, may lead to a mistaken diagnosis. It is suggested that the only certain method of diagnosis consists of clinical and histological examination of the vaginal mucosa. In histological examination, pH estimations, bacteriological, and cell smear examinations, a clear knowledge of the physiological variations of each is essential as a background for the diagnosis of vaginitis.

P. J. KEARNS

**Diabetes Mellitus and Pregnancy.** Barns, H. H. F.: *J. Obst. & Gyn. of the Brit. Emp.*, 1941, 48: 707.

A series of 25 pregnancies in diabetics in 21 patients are reviewed. It was found that the average age of the patients when the onset of the diabetes occurred was 31 years. The average age when pregnant for the first time while suffering from diabetes was 33.3 years. It is suggested that the tendency for the onset of the diabetes to occur in the latter part of the child-bearing period is largely responsible for the comparative rarity of pregnancy occurring in the diabetic. The insulin requirements were increased as pregnancy advanced in 74 per cent of the cases. The maternal prognosis is good and pregnancy does not make the diabetes worse, provided that this is well treated. The incidence of toxæmia in pregnant diabetics is not much higher than in non-diabetics. The fetal mortality was 44 per cent. It is suggested, from the review of this small series, that toxæmia of late pregnancy is a potent cause of intra-uterine death of the viable fetus and is twice as lethal to the fetus of the pregnant diabetic as to the fetus of the non-diabetic expectant mother. Congenital deformities, gigantism and hyperglycæmia are briefly reviewed. The advisability of giving extra sugar to the new-born infant of the diabetic is stressed, and the management of the pregnant diabetic suggested by these facts is outlined.

P. J. KEARNS

**X-ray Localization of the Placenta.** Buxton, B. H. and Potter, C.: *Am. J. Obst. & Gyn.*, 1942, 1: 610.

Two separate procedures are used. First, right and left lateral views of the entire uterus are taken with technique designed to give maximum soft tissue contrast. Low voltage and relatively high speed are essential. By this technique the authors were able to localize the

placenta in 86.1 per cent of 108 cases. Of these 74 were fundal and 19 showed the placenta to lie wholly or in part in the lower uterine segment. In 9 no placenta was seen, and in 4 there was uncertainty about the significance of the shadows. In 7 of the 9 cases where no placenta was visualized, placenta prævia was subsequently demonstrated by the second method. At present this consists of anteroposterior x-rays of the pelvis taken with a precision stereoscopic technique, with 4 per cent sodium iodide in the bladder. In these films also a modified soft tissue technique is employed. One hundred and twenty-five c.c. and even up to 200 c.c. is used. When the stereoscopic films are viewed in the precision stereoscope widening of the soft tissue space and deflection or distortion of the anterior or posterior horn of the bladder can very accurately be determined. If placenta prævia is definitely diagnosed, no vaginal examination is made. By co-ordinating these two methods the authors were able to localize the placenta in 97.6 per cent of their cases. In 17 cases of placenta prævia the diagnosis was accurately made in 16.

ROSS MITCHELL

### Radiology

**Relation of Density of Cholecystographic Shadows of the Gallbladder to the Iodine Content.** Joffe, H. and Wachowski, T. J.: *Radiology*, 1942, 38: 1.

A series of patients with gallbladder disease (usually stones) were given tetraiodophenolphthalein the night before operation and a cholecystogram was made next morning just before the anæsthetic was given. In some cases no shadow of the gallbladder was obtained; in others shadows of variable density containing negative shadows of stones were seen. By correlation of these films with quantitative determinations of the iodine content of the bile obtained from the gallbladder at operation, it was found that a concentration of about 2.5 mg. of iodine per gram of bile (0.25 per cent) is necessary for faint visualization of the gallbladder. Moderate visualization of the gallbladder was obtained with an average iodine concentration of 0.39 per cent, while dense shadows were obtained with an average iodine concentration of 0.89 per cent. By the use of an aluminum densimeter ladder, it was found that a water phantom approximates closely the absorption conditions found in the average patient during clinical radiography. With rubber bags, 37 cm. in diameter, containing 30 c.c. of bile, to which iodine in the form of tetraiodophenolphthalein had been added in concentrations ranging from 0.14 to 0.93 per cent iodine, it was found that approximately 0.25 per cent of iodine was necessary for a faintly visible shadow to be obtained on roentgenography. There was therefore an agreement between the two methods used in determining the amount of iodine required to produce a shadow.

R. C. BURR

### Oto-Rhino-Laryngology

**Postural Instillation: A Method of Inducing Local Anæsthesia of the Nose.** Moffett, A. J.: *J. Laryn. & Otol.*, 1941, 56: 429.

This article describes a method of anæsthetizing the nasal cavities which attempts to avoid the disadvantages of a local anæsthetic while retaining its advantages. The anæsthetic recommended is cocaine hydrochloride and adrenaline in the following strengths. Three per cent cocaine hydrochloride in one-half of 1 per cent of sodium bicarbonate with the addition of one-quarter of the total volume used of one in one thousand solution of adrenaline hydrochloride. The total amount of solution used is sixty minims of the cocaine solution and fifteen minims of adrenaline. The solution is instilled with a blunt needle, solid-ended with lateral holes, the patient's head being in a lateral dependent position. Half the mixture is squeezed into each nostril in the following way. First two or three minims are dropped on to the septum. Then the nostrils are squeezed together. Next thirty minims are inserted into the nostrils, fifteen into each. Ten minutes later the patient receives the remainder of the solution and pinching the nostrils rolls over on to his face. This position is maintained for ten minutes, after which anæsthesia is complete. This method has been used by the author in forty cases of all types of nasal operation without any unpleasant reactions.

GUY H. FISK

### Anæsthesia

**Continuous—Serial, Fractional, Controllable, Intermittent—Spinal Anæsthesia: With Observations on 1,000 Cases.** Lemmon, W. T. and Paschal, G. W.: *Surg., Gyn. & Obst.*, 1942, 74: 948.

Since their first administration of continuous spinal anæsthesia on April 10, 1939, the authors have given more than 1,250 entirely satisfactory anæsthesias by this method. The anæsthetic agent has been novocain (procaine hydrochloride). It was chosen as it was considered to be the least toxic. By this method they are able to give just sufficient dosage to produce anæsthesia to the desired level and degree. This anæsthesia is maintained as long as necessary by adding subsequent small doses as they are needed. Thus the method has been changed from "single dose" to the "fractional dose" technique which places spinal anæsthesia in the same category as other anæsthesias administered by the continuous or fractional dose method; such as intravenous anæsthesia, ether, cyclopropane, nitrous oxide, etc.

This is accomplished by leaving a flexible special alloy spinal needle *in situ* after lumbar puncture and administering additional doses through a thirty-inch fine bore rubber tubing attached at one end to the needle and at the other to a 10 c.c. Luer-Lok syringe containing

10 c.c. of 5 per cent novocain solution (50 mg. per c.c.m.). All connections are of the Luer-Lok type and the tube is used in conjunction with a special thick rubber mattress with a "well" removed opposite the 3rd lumbar space which leads to the outside of the mattress and through which the tube passes. The primary dose is usually 100 to 150 mg. of novocain or 2 to 3 c.c. of the 5 per cent solution. Subsequent doses of 50 mg. are given from time to time as the anaesthesia wears off. Height of anaesthesia is determined by the level chosen for injection and the amount of tilt given to the table. Subsequent doses require about 90 seconds to act and are given about every thirty minutes in the average case.

In this series of cases there were no anaesthetic fatalities and no neurological complications. No supplementary anaesthesia was required in any case except one lobectomy for bronchogenic carcinoma who received cyclopropane for cough brought on by tugging on the bronchus. This was for one stage of the operation only and not administered continuously. Toxic symptoms of overdose could be controlled by rapid aspiration of spinal fluid (3 to 10 cubic centimetres) and by giving inhalations of oxygen.

The solution employed is 500 mg. of novocain dissolved in 10 c.c. of cerebrospinal fluid removed by aspiration. This gives a 5 per cent solution, of which 2 c.c. are required to fill the rubber tubing completely and expel the air. The tubing is then connected to the spinal needle and syringe and the required dose administered (2-3 c.c. of solution). If these 8 c.c. of 5 per cent novocain solution are used up, additional solution can be made up by dissolving novocaine crystals in distilled sterile water to the same concentration (5 per cent).

Of the 1,000 operations in this series, 970 were below the diaphragm and 30 above it. The youngest patient was 7 years and the oldest 83 years. The average length of operations was 50.4 minutes but one gastrectomy required 215 minutes (3 hours and 35 minutes). One of their colleagues reported using this method to produce satisfactory anaesthesia during the entire course of a gastrectomy requiring 6 hours. Of these 1,000 cases the average dose of novocain was 219.9 milligrams. In the operations done above the diaphragm much larger doses were used, up to 445 mg. The largest total dose given to any one patient was 2,200 mg. This indicates that there is an individual tolerance and that the dose in any given case is enough. The average fall in blood pressure was 12 points. The incidence of headache was 2.8 per cent and that of urinary retention 3.4 per cent. There were 39 cases of pulmonary complication: 19 of these were bronchopneumonia; 9 were lobar pneumonia; 4 were atelectasis; and 2 were pulmonary embolism. There were no neurological symptoms over a two-year

period. There were 47 deaths among this series of 1,000 cases, making the gross mortality of 4.7 per cent but 27 had malignant growths and 9 suffered from diffuse peritonitis. There has not been a death reported from the use of continuous spinal anaesthesia and the above deaths did not appear to have any relation to the anaesthesia.

F. ARTHUR H. WILKINSON

### Therapeutics

**Antibody Response of Patients with Pneumococcic Pneumonia Treated with Sulfadiazine and Sulfathiazole.** Finland, M., Strauss, E. and Peterson, O. L.: *Ann. Int. Med.*, 1942, 16: 1.

Antibody studies were carried out in two groups of patients with pneumococcic pneumonia, one treated with sulfadiazine, and the other with sulfathiazole. The antibody response in these two groups of patients was very similar, as judged by the results of the mouse protection, agglutinin, and precipitin tests. The results of mouse protection and agglutinin tests in these two groups of cases were essentially the same as those previously reported in sulfapyridine-treated cases, and in patients who recover without specific serum or chemotherapy. The precipitin test with type-specific polysaccharide is the least sensitive of the three tests employed in this study as a measure of antibody production in patients with pneumococcic pneumonia, the mouse protection test is the most sensitive, and the agglutination tests is intermediate.

S. R. TOWNSEND

**The Use of Sulfanilamide in the Treatment of Acute Glomerular Nephritis.** Williams, R. H., Longcope, W. T. and Janeway, C. A.: *Am. J. M. Sc.*, 1942, 203: 157.

Williams and his co-authors have treated 42 persons ill with acute hæmorrhagic nephritis by means of sulfanilamide and compared the results with a group of 108 similar patients used as controls. The treatment was identical, except for the chemotherapy. The results indicate that in the subjects who received sulfanilamide the foci of infection cleared up more rapidly, the signs of renal damage disappeared more quickly, exacerbations of the disease after tonsillectomy were less frequent, and the duration of oedema and hypertension was shorter. Only one death occurred in the acute stage in the sulfanilamide-treated group, whereas 12 of the 108 controls died in this phase of the disease. The course of the immunological reactions, based on the antistreptolysin titre of the blood serum, was practically the same in the two groups. There was no evidence that sulfanilamide caused renal damage in any case. The dosage employed varied from 1.2 to 6 gm. daily, but was commonly from 2.4 to 3.6 gm., divided into six equal doses, at four hour intervals. The total dosage varied from 6 to 169 gm., averaging 49 gm.

E. S. MILLS

### Pathology and Experimental Medicine

#### La Revue Canadienne de Biologie. 1942, No. 3.

Le troisième numéro de la *Revue canadienne de Biologie* est le plus volumineux de ceux qui ont paru jusqu'ici. Il ne contient pourtant, par exception, qu'un seul article, 132 pages de texte et 50 figures, sur les "*Tumeurs encapsulées et bénignes des nerfs*". Dans ce travail le Professeur Pierre Masson résume les résultats de 15 années de recherches sur ces tumeurs, dont la nature et l'origine sont depuis longtemps discutées par les médecins. Son argumentation est basée sur l'étude des nerfs embryonnaires en voie de développement et sur celle des nerfs adultes en régénération. Une fois connus les aspects variés et changeants des constituants normaux des nerfs lorsqu'ils se multiplient, l'auteur passe à l'étude des tumeurs nerveuses et montre leur origine précise, la nature de leurs constituants et les relations de leurs diverses formes. En publiant ce travail, la jeune *Revue canadienne de Biologie* rompt avec une coutume qui tend à s'établir sur ce continent: celle qui consiste à n'admettre que des articles très courts et aussi peu illustrés que possible. Elle a compris que les dimensions d'un article doivent être adaptées à la difficulté de son sujet et que les sciences biologiques ne peuvent se passer de figures, de toutes les figures utiles.

JEAN SAUCIER

### Hygiene and Public Health

#### Nutritional Deficiency and Infection. 1. Influence of Riboflavin or Thiamin Deficiency on Fatal Experimental Pneumococcal Infection in White Mice. Wooley, J. G. and Sebrell, W. H.: *Public Health Rep.*, 1942, 57: 149.

A series of experiments on white mice are reported which appear to show that riboflavin or thiamin deficiency play some rôle in the resistance of these animals to infection from the pneumococcus. The strain of mice used was a pure strain which had been maintained during a period of 4 years by promiscuous mating. A basic diet, deficient in most vitamins, was fed all mice and various vitamins were added to this basic diet as the experiments demanded. In general the diets were made adequate for all vitamins except for thiamin and riboflavin. Mice, having been kept on an adequate or deficient diet as the case might be for a period of 14 to 21 days were inoculated intranasally with type 1 or 2 pneumococcus. An equal number of mice on the adequate or deficient diet were kept as controls and inoculated with sterile broth only. In all experiments it was shown that the mortality from the pneumococcus was substantially higher in the vitamin deficient diet group. The administration of riboflavin at the time of inoculation did not reduce the mortality.

FRANK G. PEDLEY

#### Immunization with Inactive Virus of Influenza B: Comparison of Antibody Response with that Produced by Infection. Eaton, M. D. Martin, W. P. and the Personnel of Naval Laboratory, Research Unit No. 1: *Public Health Rep.*, 1942, 57: 445.

The authors cite experiments which indicate that the immunization of human beings with formalinized preparations of influenza A virus effects a reduction of infection by about one-half. No similar records are available for influenza B virus. The experiments dealt with the increase in immune bodies in the blood of human volunteers after inoculation with a formalinized influenza B vaccine. There are two general methods in use for determining increase in immune bodies in virus infections. The first is the neutralization test which consists essentially in the mixture of the serum to be tested with known amounts of virus and then inoculation into susceptible animals. The neutralization is recorded by the degree of protection conferred. The second method is that of complement fixation. It was found in these experiments that neutralization body increase following vaccination paralleled fairly well the increase following clinical infection. The increase in complement fixation, however, was less in the vaccinated subjects than in those who had had a clinical infection. It is evident from this that the antigenic response to vaccination is not identical with that produced by infection. The virtue of a vaccine like that under consideration must be judged by its action during an epidemic rather than by laboratory studies.

FRANK G. PEDLEY

### Obituaries

Dr. William James Dobbie, for 33 years physician-in-chief of the Toronto Hospital for Consumptives at Weston, died unexpectedly on April 21, 1942. He had retired from the hospital in 1933. Even after his retirement Dr. Dobbie continued to engage actively in the fight against tuberculosis to which he had devoted such a great part of his life. He was in charge of the clinic at the Gage Institute where more than 10,000 patients a year are examined. He continued also to lecture to nurses at Weston Sanatorium and to those taking post-graduate courses there. He also was adviser to the board of trustees and represented them at the Canadian Hospital Association and other medical bodies.

Dr. Dobbie was born in Guelph just 69 years ago. He received his primary and secondary school education in the Guelph Public Schools and Collegiate Institute. He graduated in arts at the University of Toronto and then entered medicine at Trinity University. Soon after the two universities were combined and he graduated in medicine from the University of Toronto in 1905. In the fall of his graduation year he became associated with the fight against tuberculosis which was to be his life work and in his chosen field was most highly regarded among members of the medical profession.

The news of Dr. Dobbie's unexpected passing came as a distinct shock to a host of friends, especially to those in his profession who had worked with him.

**Dr. Thomas Ross Johnson**, of Great Village, N.S., died at the age of sixty-two years, following an illness of more than a year. Dr. Johnson was born at Brule, Colchester County, but his boyhood was spent at Great Village. After graduation from Dalhousie University in medicine in 1904, he spent two years in practice at Economy, then returned to his native heath where he served till his last illness.

In addition to the arduous demands of his big practice, Dr. Johnson assumed many tasks. The farm on which he lived was one of the finest in the county and he kept a highly prized herd of pure-bred Guernseys. For many years he was interested in fast horses which he raced on the provincial tracks. He served his time as county medical officer and county coroner. He took an active part in the Colchester-East Hants Medical Society and in the Nova Scotia Medical Society.

**Dr. Lewis Johnstone Lovett**, of Bear River, Nova Scotia, died on April 27, 1942. Dr. Lovett's death came unexpectedly at Pinehurst, North Carolina home of his brother, Col. H. A. Lovett, of Montreal, where he was convalescing after a serious illness. He was seventy-three years of age.

Dr. Lovett was a native of Kentville, N.S. An Arts graduate of Acadia University, he took his medical degree from the University of New York in 1891. Setting up in practice at Bear River he served that community down through the years, to his death. From 1920 to 1925 he represented Digby and Annapolis counties in the Dominion Parliament. He was active for many years in the Digby Annapolis Fish and Game Association, and served as president of the Bear River Board of Trade.

**Dr. Andrew Wesley McClennan**, a medical practitioner in Toronto for thirty-three years, died on May 9th, at the Toronto Western Hospital. Born at Palmerston, he was the son of John and Mary Fawcett McClennan. Before entering the field of medicine Dr. McClennan taught school in Moorefield, Ont. He graduated in medicine from the University of Toronto in 1904, and the same year started practice in Toronto. For several years he was head of all branches of the out-patient services of the Toronto Western Hospital, resigning this position three and a half years ago.

**Dr. Ernest Fraser Moore**, of Canso, N.S., died at his home early in May, 1942. He was seventy-one years of age. Dr. Moore was born in Woodstock, N.B. In 1895 he graduated from the Dalhousie Medical School. He practised in Cheverie and served on the staff of the Nova Scotia Hospital and Camp Hill Hospital before going to Canso in 1921. There, in addition to his service to the community in general practice, he was staff medical officer to the Western Union Cable Company, port physician, and town health officer.

**Dr. Emile Ostiguy**, of Montreal, died on April 29, 1942. Born in Chambly on June 23, 1866, a son of Joseph Ostiguy, merchant, and Emilie Saint Germain, Dr. Ostiguy studied at Ste. Therèse College, St. Hyacinthe College and Laval University, now the University of Montreal. He graduated in medicine in 1889 and practised for the next 20 years in Chambly and St. Hyacinthe.

In 1910, Dr. Ostiguy entered the real estate field and for a number of years was a prominent realty broker in Montreal. Among the companies he founded and directed were La Compagnie des Boulevards de Montreal; Montreal Suburban Land, Montreal Island Land and General Realty and Investment.

Dr. Ostiguy first married Henriette Bernier, daughter of Hon. E. Bernier, Minister of Internal Revenue, in the Laurier Cabinet and later chairman of the Board of Railway Commissioners, in October, 1889. Of this union two sons and a daughter were born; Paul Emile Ostiguy, broker and vice-president of the Montreal Curb Market; Lieut. Bernier Ostiguy, of the Regiment de Maisonneuve, a lawyer, who has just returned from active service overseas; and Germaine, wife of Lieut.

Col. William Morgan, M.C., now serving overseas. His second wife, formerly Clothilde Phaneuf, survives him.

**Dr. George Walter Rogers**, who had practised in Dauphin, Man., for nearly thirty years died in the Dauphin General Hospital on April 28th in his 67th year. Born at Newmarket, Ont., he came with his family when three years old to Plumas, where he received his early education. He graduated in Medicine from the University of Manitoba in 1905 and began practice in Kelwood. In 1914 he moved to Dauphin, where he became a leading figure in the life of the community. He was at one time coroner and was a past president of the Rotary Club and of the Dauphin Liberal Association. For some years he was a member of the executive of the Manitoba Medical Association, and in 1935 he was president. He is survived by his widow and three sons, George, overseas with the Queen's Own Highlanders; Arthur, Winnipeg; and William, R.C.A.F., Toronto.

Walter Rogers' geniality and sincerity won him many friends not only in the medical profession but throughout northwestern Manitoba and in the city of Winnipeg.

**Dr. John James Roy**, aged 67, who practised medicine in Sydney, N.S., for 40 years, died suddenly on May 13th at his home. He was born at New Glasgow in 1874 and received his medical degree from McGill University, Montreal (1897). Dr. Roy, in addition to his private practice, was superintendent of the Dominion Steel and Coal Company's emergency hospital and was medical officer of the port of Sydney.

**Dr. Henry B. Stacpoole** died on May 12, 1942, at Cardston, Alta., where he had practised since 1906. He was born in England in 1870, and came to Canada when a youth. He was a graduate of the University of Manitoba (1905).

## News Items

### Alberta

**Dr. R. R. MacLean**, of the Mental Hospital, Ponoka, has been appointed General Medical Superintendent of Mental Institutions. He will continue as Superintendent of the Ponoka Hospital. The idea of the change is to co-ordinate the work of the various institutions.

Under the Venereal Prevention Act of Alberta, it is unlawful for any other than a qualified medical practitioner to treat a person for the above disease. Recently one Fay Nan, of Edmonton, was fined \$75.00 and costs or 3 months in jail, for attempting to treat one suffering from such disease.

The Calgary Retail Druggists Association has issued a circular letter to the medical profession asking that, owing to the restriction in deliveries, an assistant or nurse call for articles other than prescriptions, the purchase price of which is less than \$1.00.

Owing to many medical enlistments, it is with difficulty that the Government is able to man their Health Units. Recently Dr. Cutsungavich has relinquished his practice at Willingdon to take charge of the Health Unit at Holden.

Quite an agitation is going on in the Province to have a special institution for senile and epileptic patients, so that neither the general hospitals nor the mental institutions will be burdened with the responsibility of their care. As the Government made no financial provision at the last session the matter will be held over to a later budget.

The matter of provincial life insurance is still under discussion. The College of Physicians still contend for

a reasonable fee for proper examination and the Government Insurance Office contend that for the moment, while they are in the experimental stage in life insurance, the physicians should accept less than \$5.00 for a most thorough examination.

The Department of Agriculture at Ottawa is making further investigations as to the establishment of other restricted areas into which non-tuberculin tested animals may not be shipped. It has been demonstrated that where there are many tuberculous herds, there is a great increase in the number of human tuberculosis patients. A health unit east of Edmonton has protested that persons with active tuberculosis should not be discharged from provincial sanatoria.

There is some thought being given to the question of stopping the excess writing of narcotic prescriptions, by having a general understanding among all Colleges of Physicians and Surgeons, as to common action being taken against those members who do this. One suggestion is that as soon as any physician has had his name put on the "restricted list" by the Federal Government, he should immediately be called before his provincial Discipline Committee, and his case investigated.

G. E. LEARMONTH

### British Columbia

The Annual Meeting of the Council of the College of Physicians and Surgeons was held on May 4th.

Those present included: Dr. Wallace Wilson, the President, Dr. H. H. Milburn, both representing Medical District No. 3; Dr. W. A. Clarke, Vice-President, representing Medical District No. 2; Dr. F. M. Auld, of Nelson, representing Medical District No. 5, which comprises the East and West Kootenay; Doctors Thomas McPherson and F. M. Bryant of Victoria, representing Medical District No. 1, which extends to Atlin, the most northerly point. Dr. A. J. MacLachlan, Registrar, and Dr. M. W. Thomas, Executive Secretary were present.

The election of officers for this year resulted as follows: Drs. W. A. Clarke, *President*; F. M. Bryant, *Vice-President*; H. H. Milburn, *Treasurer*. The *Executive Committee*: Doctors Thomas McPherson, F. M. Bryant, Wallace Wilson, H. H. Milburn and W. A. Clarke (Chairman).

The Annual Meeting of the Vancouver Medical Association was held on May 5, 1942.

The following list of officers were elected: Dr. J. R. Neilson, *President*; Dr. H. H. Pitts, *Vice-president*, Dr. Gordon Burke, *Honorary Treasurer*; Dr. A. E. Trites, *Honorary Secretary*; and two members on the *Executive Committee*, Drs. J. R. Davidson, and J. A. McLean.

The incoming President, Doctor J. R. Neilson, has been practising here for sixteen years and specializes in surgery.

The College of Physicians and Surgeons of British Columbia intends to take steps in the daily press to warn the public of the necessity for consideration with regard to the calls made on the medical profession. A copy of the display advertisement which can be found elsewhere in this issue, is now in the printer's hands for publication in the press. This is made necessary by the greatly increased demands on doctors, and we hope will have a very good result.

### Manitoba

The Departments of Agriculture and of Health and Public Welfare of Manitoba have launched their medical research program for the control of sleeping sickness. The treatment will be limited to male adults of 21 years and over; this having been the population group most seriously attacked by the sleeping sickness epidemic in 1941. Blood tests will be taken before immunization starts in order to determine the present proportion of immunity. Another blood test will be taken a few weeks after the immunization test is completed. Combined

with this there will be 100 per cent immunization of the horse population. The picked group of municipalities chosen for the immunization of horses is in south-west Manitoba. This district was picked to work in with similar plans in Saskatchewan and Dakota, if any such plan should be undertaken there.

Succeeding Dr. H. M. Speechly who retired May 1st, Dr. W. R. Gorrell has been appointed provincial coroner for the Winnipeg area. Dr. Gorrell is physician for Headingly jail and will continue this work along with his duties as coroner.

Officers of the 7th Infantry Brigade honoured their officer commanding, Col. D. S. MacKay, at a dinner in Minto armories. The occasion marked his relinquishment of his command of the 7th Brigade, which has now been formed as the 38th Infantry Brigade under Col. R. G. Graham.

The Sanatorium Board of Manitoba has appointed Mr. T. A. J. Cunnings full time director of rehabilitation with duties beginning May 1st. His office will be in the Central Tuberculosis Clinic, Winnipeg.

Within a reasonable time after admission each patient in any of the tuberculosis sanatoria of Manitoba will be interviewed by the director to determine the patient's occupational experience, aptitudes, desirability or otherwise of returning to former occupation, the possibility of study for new occupation or acquiring greater knowledge of former occupation, and of drawing up a specific plan for each patient's post-sanatorium employment. This plan will be linked with the Department of Education, the patient's previous employer, the established employment offices and the recognized social agencies.

ROSS MITCHELL

### New Brunswick

Major J. P. MacInerny has been promoted to the rank of Lieutenant-Colonel, to command No. 21 Field Ambulance which is to be recruited from Military Districts No. 6 and 7. Colonel MacInerny only recently returned from England, where he was serving with the R.C.A.M.C. for two years. On his return, he was the guest of honour at a complimentary dinner organized by his colleagues in Saint John.

Dr. D. J. Tonning has been appointed Junior Physician on the staff of the Saint John General Hospital.

Major Joseph Tanzman, of Saint John, who for some time has been on duty in military hospitals in Ontario, has been warned for overseas service in the near future.

Dr. G. M. White, of Saint John, has been appointed the New Brunswick representative on the board of governors of the Victorian Order of Nurses.

An abortive episode of infantile paralysis broke out recently in some of the middle counties of New Brunswick.

Additional officers recommended for appointment to the 2nd 14th Field Ambulance Reserve Army include Drs. J. R. Nugent, T. E. Grant, J. R. Collins, and L. MacPherson of Saint John.

Capt. Paul Melanson, of Moncton, has returned on duty from England. It is reported that he is to be appointed to a unit now being organized.

A. STANLEY KIRKLAND

### Nova Scotia

Shorn of the colour and glamour of its pre-war sessions, the Halifax Medical Society held its annual dinner quietly at the Nova Scotian Hotel with the president, Dr. J. V. Graham, in the chair. Welcome guests were the medical officers of the services present

in Halifax. The financial standing of the society having been made secure by the threat to publicize those tardy with their dues, the group appointed a new slate of officers for the ensuing year: *President*, Dr. H. A. Payzant, Dartmouth; *Vice-president*, Dr. W. G. Colwell; *Secretary-treasurer*, Dr. Donald MacRae.

With the departure of Dr. J. A. Webster to join the Royal Canadian Air Force, Yarmouth is without the medical services of a member of the Webster family for the first time in three generations. Dr. W. C. O'Brien succeeds Dr. Webster as health officer.

Dr. E. David Sherman, of Sydney, has been awarded associateship in the American College of Physicians, at its annual meeting in St. Paul, Minn.

Dr. V. F. Connor, native of Halifax, and follower of the sea, paid a visit to his home city recently. The 68-year-old ship's doctor is serving his second stretch in the merchant marine. Between 1902 and 1907 he sailed 480,000 miles. That satisfied him for a time. The *Wanderlust* subdued, he roamed ashore, setting up his shingle in almost a dozen villages through the provinces by the sea, and serving as army medical officer in Halifax through the time of the 1917 explosion. Having gone round the world seven times in the last five years, Dr. Connors is able to state, with authority, that things have changed since first he went to sea, but not, it would seem, his Bluenose love for the tang of salt-sea spray.

ARTHUR L. MURPHY

### Ontario

The *Queen's Review* reports Major Norman I. McLeod, of Kingston, as missing in India since February 22nd. Receiving a commission in the R.A.M.C., he served with the Imperial Army, first in Egypt, and has been in India since 1936, where he served as P.A.D.M.S., 17th Indian Division.

F/Lt. R. W. Male, of Tottenham, is now Senior Medical Officer, R.C.A.F., stationed at Torbay, Newfoundland.

The annual meeting of the Council of the College of Physicians and Surgeons of Ontario was held during April. Dr. A. Moir, of Peterborough, was elected President of the College for 1942 and Dr. C. S. Sanborn, Vice-president.

Temporary registration, which was granted last year to ten British medical officers, affects two Medical Officers at the Netherlands Stratford Military Training Camp and four others at the Owen Sound and Windsor Camps for Polish troops.

It is reported that 750 members, one in six physicians and surgeons registered in Ontario, are now serving in the ranks of the Canadian forces. This number will be immediately increased from members of the present graduating classes.

The status of the Military Hospitals in Toronto has been changed. Toronto Military Hospital becomes Chorley Park Military Hospital, Chorley Park, Toronto. The former Chorley Park Military Hospital becomes Toronto Convalescent Hospital, Melita Street, rear of Christie Street Hospital.

At the request of the Ontario Medical Association, the Registrar of the College of Physicians and Surgeons of Ontario has sent a questionnaire to each practitioner in Ontario, asking for an expression of opinion as to the desirability of a compulsory composite fee to cover the fees of the Canadian Medical Association, the Ontario Medical Association, and the College.

In the April issue, Lt.-Col. R. M. Wansbrough was incorrectly reported as being in command of a Canadian

Hospital in Britain. He should have been reported as in charge of the Surgical Division of No. 15 Canadian General Hospital, of which Dr. G. B. D. Farmer, of Hamilton, is in command.

In a luncheon address before the annual general meeting of the Board of Governors of the Victorian Order of Nurses for Canada in Ottawa on May 8th, Dr. Alan Brown, of Toronto, spoke on the subject—"Child welfare in war time".

In pointing out the great advances made in child health, Dr. Brown quoted the figures for Toronto, in which infant mortality in 1914 was 155 deaths per 1,000, against 39.1 per 1,000 at the end of 1941. He urged the appointment of an administrator of child health, with powers in his field similar to that of those governing price control. There is still much to be done throughout Canada in the improvement of the diets used for children in many communities, the child being the best and most lasting asset of the state. Undernutrition, defective feeding, physical defects, mean much lower grades of health in the adult.

Alpha Omega Alpha, the Honour Medical Fraternity, has established a Chapter at the University of Western Ontario.

Dr. Edwin Seaborn, of London, Honorary President of the London and Middlesex Historical Society, has on display at the London Public Library a collection of books, manuscripts, and other material which illustrates the medical history of the London district.

J. H. ELLIOTT

### Quebec

Le Dr Jules Brault de l'hôpital Notre-Dame a été récemment élu président de la "Montreal Ophthalmological Society".

Le Conseil médical de l'hôpital Notre-Dame pour l'exercice 1942-43 se compose comme suit: Président: Dr Léon Gérin-Lajoie; Vice-président: Dr Albert DeGuise; Secrétaire: Dr Georges Hébert. Les membres de l'exécutif du Conseil sont: les Drs B. G. Bourgeois, A. Léger, A. Bertrand, D. Marion et P. Panneton.

L'Université de Montréal donnera cette année des cours d'été. Cette accélération des cours permettra aux élèves d'être plus rapidement prêts à rendre les services que l'on attend d'eux en temps de guerre. L'année académique 1942-43 se terminera à la fin de mars 1943.

La semaine de pédiatrie de l'hôpital Ste-Justine commencera le 1<sup>er</sup> juin et se terminera le 6. Sous la direction du Dr Gaston Lapierre, les travaux suivants seront présentés: Conclusions pratiques en broncho-œsophagologie; l'électrocardiogramme chez l'enfant; le cancer chez l'enfant; les dysendocrinies au cours de la puberté; troubles digestifs avec prédominance de diarrhée chez le nourrisson; lésions du canal inguinal chez l'enfant; lutte contre la mortalité maternelle; affections musculaires de l'œil; indications et technique de l'encéphalographie chez l'enfant, et, l'urographie chez l'enfant.

Les Journées médicales annuelles de la Société Médicale de Montréal auront lieu les 15, 16, 17 et 18 juin aux hôpitaux Notre-Dame, Ste-Justine, St-Luc et Hôtel-Dieu. Les conférenciers spéciaux sont les Drs. J. U. Gariépy, L. C. Simard, Adélard Groulx et Oscar Mercier. L'Hon. Henri Groulx, Ministre de la Santé a accepté la présidence d'honneur de ces journées. Ces séances auront lieu la matin et coïncideront avec le banquet annuel de la Société. A cette occasion, le conférencier sera M. Louis Bourgoin, I.C. professeur à Polytechnique.

Sœur Mondoux, de l'Hôtel-Dieu, vient de publier un livre intitulé: "L'Hôtel-Dieu, premier hôpital de Montréal". Ce volume, que tout médecin devrait lire, est une histoire de la médecine aux premiers temps de la colonie.

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The Montreal General Hospital held its 120th Annual Meeting on April 14th. This was made the opportunity for a historical display of some of the interesting details in the life of the hospital. The original charter was shown, together with the first minute books from which the domestic life of the institution can be gathered. The hospital has been fortunate enough to have had all its original records preserved, and these form valuable sources of history not only of the hospital itself but of the times themselves.

Photographs were shown of the original medical staff, the four Edinburgh trained men who were responsible for the founding of the medical school. Photographs also of some of the later notables were shown—Palmer Howard, William Osler, Thomas Roddick (with his "Lister spray" which he brought from London), John McCrae, and many others.

One of the most pleasing effects was produced by contrasting the first nursing costume of the training school with that of the present day. Some of the original dress material used in 1892 was made up into a uniform exact in all details. This was worn by one of the nurses at present in training, beside whom there stood one of her fellow nurses in the modern uniform. The general tendency in the uniform towards comfort and convenience in working was very noticeable.

### Saskatchewan

The regular meeting of the Regina and District Medical Society was held at the Assiniboia Club April 17th. Dr. F. A. Corbett gave a paper on "Carcinoma of the fundus".

LILLIAN A. CHASE

### General

A series of lectures is being given in Hamilton under the joint auspices of McMaster University, Hamilton Academy of Medicine, and District Number Four of the Ontario Medical Association.

One of these lectures was given by Dr. R. E. Wodehouse, O.B.E., Deputy Minister of Pensions and National Health, on March 25th. We give a short report on Dr. Wodehouse's presentation on that occasion, when he dealt with the subject of nutrition.

At the outset, Dr. Wodehouse turned to the German method of nutrition.

"Germany, ten years ago, organized a national program to assure proper nourishment for children of either sex and adults who might be able to render maximum service to the state, in industry or wherever allotted," he said. "They planned sources other than synthetic, of essentials to a full scientific diet from unusual types of natural products which would meet the requirements of their people."

Dr. Wodehouse suggested that the German scheme might have set the example, in part, for the British method of rationing. He outlined the rationing system worked out in Great Britain as follows:

"Every individual receives ration cards for rationed foods, practically on a uniform basis as to quantity. The government pays £5,000,000 annually by subsidy to producers, importers and distributors, to maintain a constant, comparatively low price for a certain number of staple foods containing what the scientists have advised are the essentials for good health. The low price maintained for these causes their people to buy them in preference to more expensive, but less nutritious food."

"Extra milk has been permitted for babies, expectant mothers and for school lunch purposes. The most important thing is that with government financed help, all employees on account of their maximum effort, physical and mental, are being given a meal in the middle of their period of work. With consideration of their ration at home, they have their caloric and other daily intake increased, tremendously, to meet what the physiologists have deemed necessary to compensate for their daily depletion of energy, by hard work."

Comparing this system with that observed in Canada, Dr. Wodehouse pointed out that here all prices are fixed,

the purchasing value of the dollar for essential foods remaining stationary.

"Our effort and your effort is one—to inform our people (a) which Canadian foods provide the maximum strength-maintaining essentials, to the greatest degree, for the cost; (b) which is the best way to cook these essential economic foods and serve them, to retain for body assimilation, the vitamins and protective elements they contain; (c) what quantities of the different foods, the different members of the family require each day (to avoid mother robbing herself to provide unnecessary amounts for the children and especially the husband).

He described at length the content of flour used in Canadian bakeries.

"Our vitamin B white flour (Canada approved) and vitamin B flour (Canada approved) and the two new loaves of vitamin B white bread (Canada approved) and vitamin B bread (Canada approved) will make available by new high extraction milling processes in Canada, the provision for Canadian consumers of all the different protective elements and vitamins contained in Canadian wheat. They will not contain synthetic vitamins. They will contain other protective elements which go with the vitamin B complex in our wheat. The flour will cost no more than you have paid for ordinary patent flour. The bread will cost no more than you have paid for ordinary bread. The difference to the consuming public will be a real one if they eat more bread. These advantages are the type of message we want to get to the people."

Dr. Wodehouse emphasized the value of canned tomatoes and citrus fruits, and told also of the new method of storing foods, that of desiccating or drying. When methods were properly carried out it had been found that the flavour and vitamin content were retained, he said. The federal government had set aside for the department of agriculture the sum of \$400,000 to hasten the development of this processing.

**The Meyers Memorial Award.**—The Canadian Medical Association receives the sum of \$100.00 a year from the estate of the late Doctor Campbell D. Meyers to provide an honorarium known as The Meyers Memorial.

The award is made in accordance with the instructions of the donor, which are:—

1. That the award shall be made "... to such member or guest of the Canadian or of one of the Provincial Medical Associations as shall write and read at the annual meeting of any of the said Associations the best thesis or dissertation. . . ."

2. That the subject shall be "... the study and treatment of those functional neuroses which, if untreated, or not treated sufficiently early might probably terminate in insanity. . . ."

"... it is impossible to classify definitely the type of diseases referred to above. I desire however to refer to those Functional Neuroses in which the psychological symptoms form the essential part of the syndrome, and to that type of Neurosis which develops in late adolescent or in adult life in a patient of previous good mental and nervous history, especially such neurosis as has its etiology in emotional overstrain caused by excessive grief, worry and allied conditions. . . ."

"I desire to exclude from this thesis the study of Mental Defectives, Paranoia and similar conditions of mental disease due to hereditary or organic states. . . ."

3. That the award shall be made "... by a Committee consisting of the President, a physician and a neurologist. . . ."

Those who wish to submit a thesis are advised to confer, in advance with the Chairman of the Meyers Memorial Committee in order to make sure that their thesis will come within the terms of the award.

The thesis must be in the hands of Dr. Geo. F. Boyer, the Chairman of the Meyers Memorial Committee, on or before May 31st if it is to be considered for the award of that year and should be forwarded to him at 184 College Street, Toronto. Any thesis received after May 31st will be considered as being submitted for the following year.



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## Book Reviews

**Four Treatises of Theophrastus von Hohenheim Called Paracelsus.** Tr. by C. L. Temkin. 256 pp. \$3.00. Johns Hopkins Press, Baltimore, 1941.

This is a publication of the Institute of the History of Medicine, the Johns Hopkins University, and commemorates the four hundredth anniversary of the death of Paracelsus. It is a tribute worthy of the occasion and reflects the scholarship and industry of the Director of the Institute, Dr. Henry E. Sigerist, who is the leading spirit in medical history on this continent and who contributes the introduction and one of the translations in this volume.

The book is notable in making available for the first time in English translation four of Paracelsus' most important treatises. The first is the famous Seven Defences in which he answers his enemies and which gives a fine portrait of the man. The second treatise, a study of the diseases of miners, is the first work on occupational diseases and thus is an important document in the history of medical literature. The next monograph dealing with the psychology and psychiatry of Paracelsus is a fascinating study of the period. The final contribution, *A Book on Nymphs, Pygmies and Salamanders*, reflects the theology and philosophy of Paracelsus. Each treatise is provided with a preface and at the end of the book is a bibliography for the guidance of students.

To all lovers of medical history and particularly to students of Paracelsus and his period this book will be a delight and a treasure. It is a noteworthy contribution to medical scholarship on this continent.

**Anæsthetics Afloat.** R. Woolmer. 120 pp., illust. 6s. H. K. Lewis, London, 1942.

This little book deserves the highest praise. The author understands the difficulties of anæsthesia afloat, where the doctor aboard is rarely a trained anæsthetist, the facilities provided for the work, and the type of men that one meets in the Navy from the "fat stoker Petty Officer", to the "tough sailor".

The various forms of anæsthesia and their indications are reviewed in turn. Open ether is covered at some length, giving a definite method of procedure, and outlining clearly the various levels of anæsthesia. The closing chapters deal with mishaps, post-operative complications and the relation of anæsthesia to war wounds, injuries, and shock. The appendices deal with tracheal intubation, and the Oxford vaporizer.

The author is to be complimented on the brevity, yet completeness of the book. It will prove of great value to the surgeons of our Navy, all of whom should have one, and also will be of great help to the Army and Air Force doctors who are forced by circumstance to work alone.

**Diabetes Mellitus.** Z. T. Wirtschafter and M. Korenberg. 186 pp. \$3.00. University of Toronto Press, 1942.

This monograph is essentially a review of the literature on carbohydrate metabolism, and its relation to diabetes mellitus. The manner in which the authors trace the early experiments of Claude Bernard, through the work of Banting, Best, to the latest works of Young and many others is most interesting.

The literature is briefly covered and an excellent bibliography follows. It is the opinion of the reviewer that rather than quoting the various articles so frequently and at such great length, the authors would have been wiser to rewrite the various opinions in their own words.

The condensed nature of the book sometimes makes it hard to follow. On page 55 there is an apparent contradiction. Speaking of toxæmias and their relation to the liver, it is first stated, "it is the power to deposit glycogen rather than to form carbohydrate that the liver seems to lack". Then one sentence later says, "Toxæmias increase the rate of breakdown

of glycogen, rather than inhibit its formation". One has to give the book one's fullest attention when reading, but to anyone who is interested in the background of diabetes, it will prove to be a helpful review.

**A Handbook of Ocular Therapeutics.** S. R. Gifford. 3rd ed., 410 pp. \$4.60. Macmillan, Toronto, 1942.

There has been considerable advancement in ocular therapy in the last few years and Dr. Gifford has brought the changes to our attention in an instructive and informative manner. He has avoided tiresome detail and placed the material in such a way, that once a diagnosis has been reached the latest and best ocular therapeutic measures are suggested and much that has proved valueless is eliminated.

The first chapter describes the minimum requirements the ophthalmologist needs for his office. There are also many helpful suggestions in the same chapter which it would be well for students and practitioners alike, to consider carefully. The classification of drugs and organ extracts is well done.

The description of the uses of x-ray and radium is a most instructive chapter. A good deal of prominence is given to glaucoma. This chapter should be read carefully. This, perhaps, is one of the most baffling of ocular diseases to deal with, but the subject has been treated in such a way, that decisions which are so difficult to make at times, will not seem quite so formidable now. These and many more chapters go to make this a book worthy of the attention of students, medical practitioners and ophthalmologists.

**A Primer on the Prevention of Deformity in Childhood.** R. B. Raney and A. R. Shands, Jr. 188 pp. \$1.00. National Society for Crippled Children, Elyria, Ohio, 1941.

This small book fulfils its purpose. In it the reader will find a simple description of the various deformities of childhood, together with notes on the etiology and methods of prevention.

The first chapter deals with the common affections which may cause deformity. The second deals with deformities of the upper extremity. The third with the lower extremity and finally the fourth chapter with deformities of the trunk.

The book is not meant for the specialist in orthopaedics but rather for the interns, physicians, students, nurses and social workers, all of whom will find it most readable and adequate for their ordinary purposes.

**Textbook of Medical Treatment.** Edited by D. M. Dunlop, L. S. P. Davidson and J. W. McNee. 2nd ed., 1179 pp. \$7.50. Macmillan, Toronto, 1942.

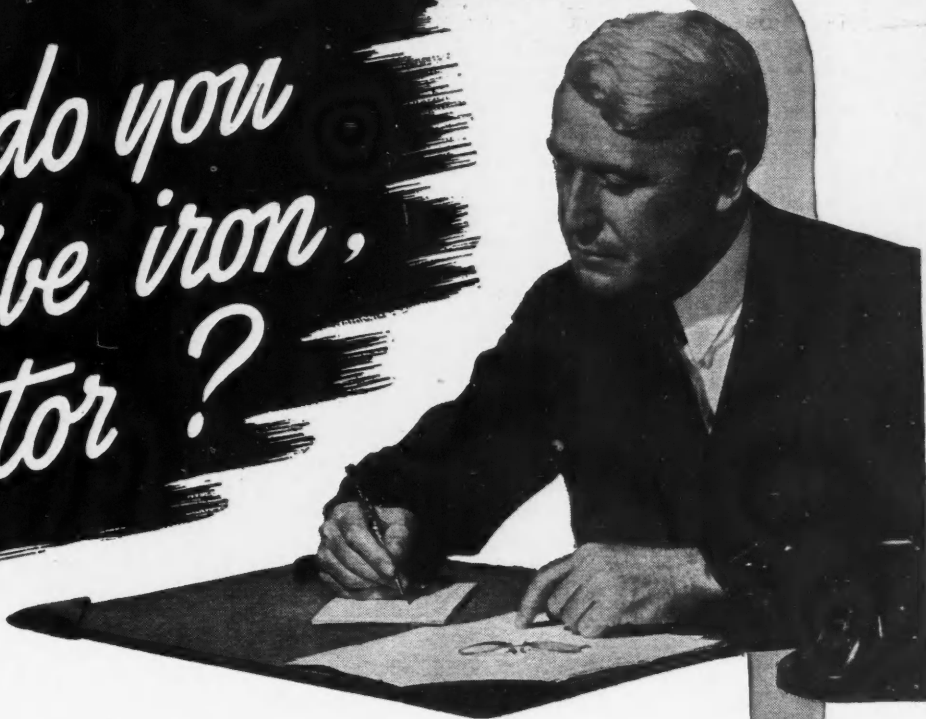
The significance and value of the book could be judged by the appearance of the second edition within such a short time. Completely reviewed, the errors of omission corrected, this book shows many changes in its chapters regarding treatment. The sections of cerebrospinal fever, septicæmia, venereal diseases, and respiratory diseases have been especially revised, and the chemotherapy of sulfanilamide clearly discussed. The section on sex hormones is a very instructive and valuable addition, as also is the chapter on the treatment of alcoholism and drug addiction.

This textbook, like its predecessor, will be gratefully received by the general physician and medical student.

**The Treatment of Burns.** H. N. Harkins. 457 pp., illust. \$6.50. C. C. Thomas, Springfield, 1942.

In the last twenty years, the problems presented by burns has aroused an immense amount of interest and has stimulated a great amount of research. The resulting advance in our knowledge of the changes produced by burns and the best methods of treatment has been great but the kernel of the secret still eludes us, as is the case in shock. What we have learned of the changes produced by burns and how this knowledge has modified treatment is ably presented by

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Harkins in this excellent monograph. In addition interesting side lights on the history of burns and on the personalities who have added to our store of knowledge are interspersed between the chapters.

Harkins has ably summarized all of our present knowledge on this complex subject. If he does not reach dogmatic conclusions it is because our knowledge at present does not permit this. He has reviewed the enormous literature of the subject and has discussed the pros and cons of every aspect of the subject. In a problem so complex and with so many contradictory conclusions arising from research, there is real need of a clear unbiased summary of our knowledge; the more so today when war brings fresh quotas of burns. Harkins' monograph fills this need. It can be recommended to all surgeons who are concerned in the treatment of burns and especially to those who are engaged in investigation to elucidate the problems of burns or improve their treatment.

**Laboratory Diagnosis of Protozoan Diseases.** C. F. Craig. 349 pp., illust. \$5.15. Macmillan, Toronto, 1942.

Dr. Craig's book gives to the medical profession the results of forty years' experience in the laboratory diagnoses of protozoal infections. He has included every well-known diagnostic procedure as well as many which have been hidden in the pages of medical journals. The text is divided into six parts—amœbiasis and flagellates, Leishmaniasis, trypanosomes, coccidiosis, malaria and balantidiasis. Each part is subdivided and classified according to the various diagnostic procedures in use for each parasite. Thus under amœbiasis, the author discusses the morphology of the parasite, the collection and preparation of material for examination, culture methods, complement fixation, animal inoculation, use of sigmoidoscope and a critique of diagnostic methods. The other subjects are treated similarly (except coccidiosis and balantidiasis which have very short chapters).

Treatment in the case of many of the protozoal infections is highly satisfactory but the application of treatment depends on correct diagnosis and far too often this is not made. Today the subject is even more important and the distinction between tropical medicine (with its predominant emphasis on the causal rôle of the animal parasite) and the medicine of temperate climates (in which the animal parasite is too often ignored completely) is gradually being broken down. The war has intensified and will still further intensify this process of disintegration. Practitioners in all rôles of life will meet more and more of these parasitic infections and a text such as this will be invaluable. It is not only a desirable addition to medical literature, it is an essential one.

**Anoxia: Its Effect on the Body.** E. J. Van Liere. 269 pp., illust. \$3.00. University of Chicago Press, 1942.

This monograph by Dr. Van Liere on the effect of anoxia on the body provides an excellent source of ready reference from the experimental viewpoint. There is condensed here all the pertinent experiments and a reasoned discussion on the varying points of view. It may be taken as a starting point of the effect of anoxia on the normal animal organism.

Unfortunately, in clinical medicine anoxia is seldom an uncomplicated event when it results from abnormal changes of function or structure. Almost the only time when uncomplicated anoxia occurs in man is at high altitudes, either of mountain-climbing or aviation, or under conditions where the oxygen of the inspired air is abnormally reduced. It therefore cannot be taken that the results recorded in this volume as the effects of anoxia are to be expected in such a simple form as is recorded here. It is, however, an excellent volume to have at hand for those interested in problems of both external and internal respiration. The bibliography is well arranged and the historical development of this important subject is set out as it is limited to each field of investigation.

**Architectural Principles in Arthrodesis.** H. A. Brittain. 132 pp., illust. \$6.25. Macmillan, Toronto, 1942.

This is a monograph for specialists in bone and joint surgery.

Mr. Brittain outlines the general subject of joint arthrodesis and emphasizes the use of an autogenous bone graft. His main deviation from routine practice is in using the bone graft placed in a position of compression rather than tension. For this reason he advocates an ischio-femoral bone graft in the hip operations and a graft laid posteriorly from the axillary border of the scapula to the surgical neck of the humerus in arthrodesis of the shoulder. These are the important points in the book but the subject matter and illustrations are all of great interest. A technique for each joint fusion is outlined.

The book is well printed and bound, with the additional asset of a series of coloured illustrations.

This is a book for the specialists' library.

**The 1941 Year Book of Pathology and Immunology.** Edited by H. T. Karsner and S. B. Hooker. 623 pp., illust. \$3.00. Year Book Pub., Chicago, 1942.

This book is a review of the current literature of the vast subject of pathology and immunology. It is well presented and easy to read.

**Acute Alcoholic Intoxication.** H. W. Newman. 207 pp. \$2.50. Stanford Univ. Press, Calif., 1942.

The various aspects of alcohol have called forth a voluminous literature without much clarity of thought. This volume does not try to solve any of the problems so much as it presents the data at present available. In spite of the large amount of investigation on the subject there are comparatively few aspects which have been completely defined.

The book is in two parts. The first section deals with the general actions of ethyl alcohol, its absorption, excretion and combustion. In the second part the toxicology is dealt with. Here the chemical diagnosis of drunkenness is taken up. The medico-legal importance of this aspect is considerable, and the data here presented are of great value. We can highly recommend the book.

**Proceedings of the Charaka Club.** Vol. 10. 260 pp. \$5.00. University of Toronto Press, 1942.

The Charaka Club is one of the many clubs that were formed by younger men eager to widen their cultural relations beyond the limits of the standard medical society. It was founded in 1899 by a group of five men, Charles L. Dana, Joseph Collins, Frederick Peterson, Bernard Sachs, and Ward Holden, who was added to the list very soon after the group formed. Not many clubs hold eight meetings before acquiring a formal title, unless we except the famous X Club of Huxley and his friends (and occasionally yves!). But it was only at the eighth meeting when a paper on Hindoo medicine by Bernard Sachs brought out the fact that Charaka was the oldest medicine man and priest whose works are still extant, that someone suggested the name for this Club. The Club has always published its proceedings, but this is the first volume to be offered for public sale. It is not a book for criticism. Who in any Club worthy of the name cares about criticism of his writing for the Club? The only critics that matter are the members themselves, and in a club of this nature it is probable that criticism is as frank as it is instant and harmless. We may say however that there are papers in it which are interesting and pleasantly written. That is saying a good deal.

## BOOKS RECEIVED

**International Clinics.** Edited by G. M. Piersol. Vol. 1, n.s. 5. 313 pp., illust. \$3.00. J. B. Lippincott, Montreal, 1942.

**Nursing Care of Communicable Diseases.** M. E. Pillsbury. 6th ed., 604 pp., illust. \$3.50. J. B. Lippincott, Montreal, 1942.

